nited States
epartment
Agriculture

nimal and
Plant Health
Inspection
Service

**Veterinary
Services**

Part III:

Health Management and Biosecurity in U.S. Feedlots, 1999

December 2000

United States
Department of

Acknowledgments

This report has been prepared from material received and analyzed by the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) during a study of management and animal health on feedlots.

The Feedlot '99 study was a cooperative effort between State and Federal agricultural statisticians, animal health officials, university researchers, extension personnel, and feedlot owners and operators. We want to thank the hundreds of industry members who helped determine the direction and objectives of this study by participating in focus groups.

Thanks to the National Agricultural Statistics Service (NASS) enumerators and State and Federal Veterinary Medical Officers (VMO's) and Animal Health Technician's (AHT's) who visited the feedlots and collected the data for their hard work and dedication to the National Animal Health Monitoring System (NAHMS). The roles of the producer, Area Veterinarian in Charge (AVIC), NAHMS Coordinator, VMO, AHT, and NASS enumerator were critical in providing quality data for Feedlot '99 reports. Special recognition goes to Dr. Guy Loneragan from the Integrated Livestock Management program at Colorado State University for his contribution to the design and implementation of the Feedlot '99 study and analysis and interpretation of these data. Thanks also to the personnel at the Centers for Epidemiology and Animal Health (CEAH) for their efforts in generating and distributing timely reports from Feedlot '99 data.

All participants are to be commended for their efforts, particularly the producers whose voluntary efforts made the Feedlot '99 study possible.

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Suggested bibliographic citation for this report:
USDA. 2000. Part III: Health Management and Biosecurity in U.S. Feedlots, 1999.
USDA:APHIS:VS, CEAH, National Animal Health Monitoring System. Fort Collins, CO.
#N336.1200.

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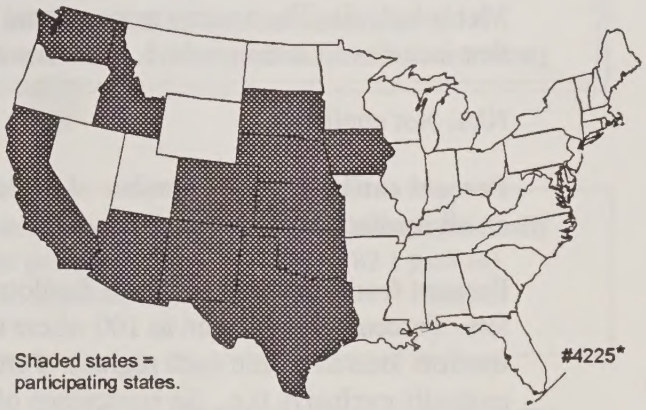
Introduction

The National Animal Health Monitoring System's (NAHMS) Feedlot '99 study was designed to provide both participants and those affiliated with the cattle feeding industry with information on the nation's feedlot cattle population for education and research. NAHMS is sponsored by the USDA:APHIS:Veterinary Services (VS).

NAHMS developed study objectives by exploring existing literature and contacting industry members and others about their informational needs and priorities.

The USDA's National Agricultural Statistics Service (NASS) collaborated with VS to select a statistically-valid sample such that inferences can be made to 100 percent of the cattle on feed in feedlots with a capacity of 1,000 head or more on January 1, 1999, in the 12 participating states (see map at right). NASS enumerators collected on-site data from the 520 feedlots for the initial report via a questionnaire administered from August 16, 1999, through September 22, 1999.

States Participating in the Feedlot '99 Study



Shaded states = participating states.

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Part I: Baseline Reference of Feedlot Management Practices, 1999 was the first in a series of releases documenting Feedlot '99 study results. A report on trends in beef feedlot management and health, released in August 2000, compared results of NAHMS' 1994 Cattle on Feed Evaluation (COFE) and initial results of the Feedlot '99 study.

Estimates related to health and health management of cattle in feedlots are documented in *Part II: Baseline Reference of Feedlot Health and Health Management Practices, 1999* (October 2000), and in *Part III: Health Management and Biosecurity in U.S. Feedlots, 1999* (December 2000). Part II and Part III report results from the second phase of Feedlot '99 data collection done by federal and state Veterinary Medical Officers (VMO's) and Animal Health Technicians (AHT's) in the 12 states. Data were collected on site from October 12, 1999, through January 12, 2000, from the feedlots that responded to the NASS questionnaire and agreed to continue participating.

Results of the Feedlot '99 and other NAHMS studies are accessible on the World Wide Web at http://www.aphis.usda.gov/vs/ceah/cahm (see Beef Feedlot).

For questions about this report or additional Feedlot '99 and NAHMS results, please contact:

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*Identification numbers are assigned to each graph in this report for public reference.

Terms Used in This Report

Cattle placed/placement: Cattle put into a feedlot, fed a high-energy ration and intended for the slaughter market.

Cattle on feed: Animals being fed a high-energy ration of grain, silage, hay, and/or protein supplement for the slaughter market, excluding cattle being "backgrounded only" (for later sale as feeders or later placement in another feedlot).

Feedlot: An area of land managed as a unit by an individual, partnership, or hired manager.

Feedlot capacity: Size groupings based on feedlot capacity on January 1, 1999. The capacity is the total number of head of cattle that could be accommodated in the feedlot at one time.

Metaphylaxis: Therapeutic management of high-risk cattle as a group prior to disease development that includes an antimicrobial. Also commonly referred to as "mass treatment."

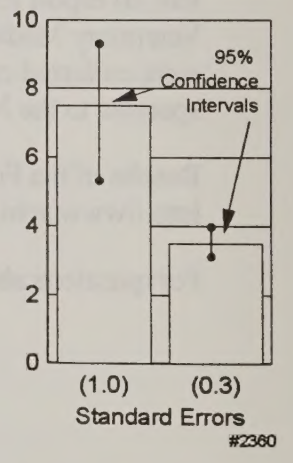
N/A: Not applicable.

Percent cattle: The total number of cattle with a certain attribute divided by the total number of cattle on all feedlots (or on all feedlots within a certain category such as by feedlot capacity or region).

Percent feedlots: The number of feedlots with a certain attribute divided by the total number of feedlots. Percentages will sum to 100 where the attributes are mutually exclusive (i.e., percentage of feedlots located within each region). Percentages will ***not*** sum to 100 where the attributes are not mutually exclusive (i.e., the percentage of feedlots using treatment methods where feedlots may have used more than one method).

Population estimates: Estimates in this report are provided with a measure of precision called the ***standard error***. A confidence interval can be created with bounds equal to the estimate plus or minus two standard errors. If the only error is sampling error, then confidence intervals created in this manner will contain the true population mean 95 out of 100 times. In the example at right, an estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in limits of 2.8 and 4.0. Alternatively, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of two. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported. If there were no reports of the event, no standard error was reported.

Examples of a 95% Confidence Interval



Repull: An animal that responded favorably to the initial course of treatment for a disease, was returned to a pen, and received additional treatment for the same disease at a later date.

Retreat: An animal that failed to respond to the initial course of treatment for a disease and required a second course of treatment.

Sample profile: Information that describes characteristics of the feedlots from which Feedlot '99 data were collected.

Section I: Population Estimates

A. Shipping Fever Prevention

Bovine respiratory disease complex (BRD), also known as shipping fever, is the primary cause of illness and death in feedlot cattle. This disease results from a complex interaction of host immunity, stressors, and infectious pathogens. When a group of cattle are exposed to various stressors, such as long shipping distances, transit shrinkage, and commingling, they are at increased risk of development of BRD, particularly if their immune systems are somewhat naive. These groups are often referred to as high-risk cattle. It is likely that bacterial infection of the lower respiratory tract is already present when these cattle arrive at the feedlot.

Left untreated, feedlot managers could expect a high occurrence of respiratory disease in these animals. Therapeutic management of high-risk cattle that includes an antimicrobial has been demonstrated to economically reduce illness and death. This practice is often referred to as metaphylaxis (or mass treatment).

1. Metaphylaxis

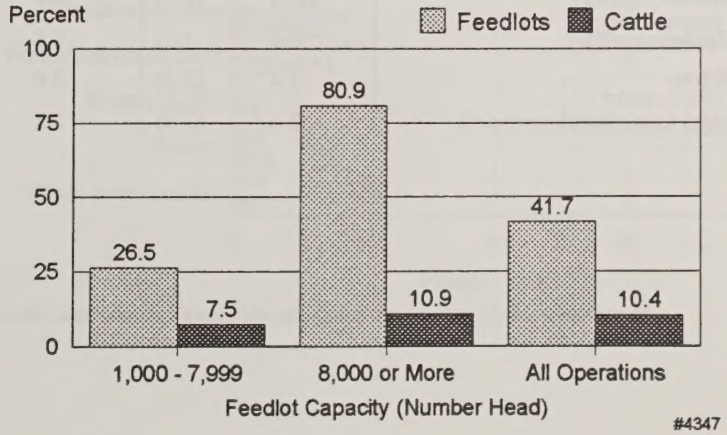
Large feedlots (80.9 percent) were more likely than small feedlots (26.5 percent) to metaphylactically treat some groups of cattle to prevent BRD. A similar percentage of large feedlots (82.1 percent) administered an injectable antimicrobial to some cattle at processing (Feedlot '99 *Part I: Baseline Reference of Feedlot Management Practices, 1999).*

a. Percent of ***feedlots*** that administered injectable antimicrobials for the metaphylaxis (mass treatment) of some cattle to prevent shipping fever by feedlot capacity:

Percent Feedlots

Feedlot Capacity (Number Head)					
1,000 - 7,999		8,000 or More		All Feedlots	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
26.5	(3.5)	80.9	(3.3)	41.7	(2.7)

Percent of Feedlots (and Cattle Placed on these Feedlots) that Administered Injectable Antimicrobials for the Metaphylaxis of Cattle to Prevent Shipping Fever by Feedlot Capacity



Overall, 10.4 percent of cattle were treated metaphylactically to prevent clinical manifestations of BRD.

b. Percent of all ***cattle*** that were treated metaphylactically (mass-treated) with an injectable antimicrobial to prevent shipping fever by feedlot capacity:

Percent Cattle

Feedlot Capacity (Number Head) 1,000 - 7,999		8,000 or More		All Feedlots	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
7.5	(1.7)	10.9	(1.3)	10.4	(1.1)

Of those feedlots that administered injectable antimicrobials metaphylactically, a greater percentage (70.3 percent) used tilmicosin than any other antimicrobial. Large feedlots were more likely than small feedlots to use tilmicosin and ceftiofur for metaphylaxis. Approximately one-third of both large and small feedlots administered injectable oxytetracyclines metaphylactically to aid in prevention of shipping fever in cattle.

The following list of antimicrobials is not mutually exclusive as feedlots may have changed their choice of antimicrobial to metaphylactically treat different groups of cattle.

c. For feedlots that administered injectable antimicrobials for the metaphylaxis (mass treatment) of cattle to prevent shipping fever, percent of ***feedlots*** by injectable antimicrobial administered and by feedlot capacity:

Percent Feedlots

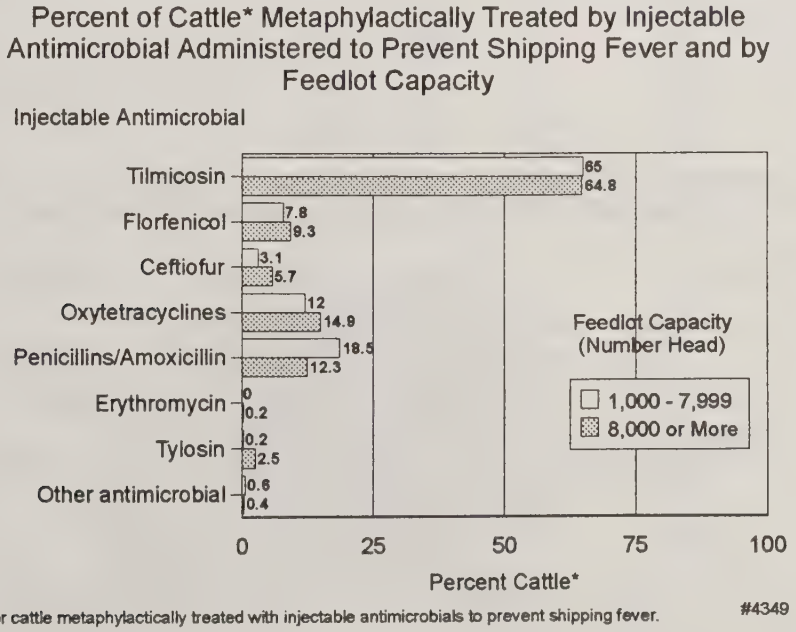
Injectable Antimicrobial	Feedlot Capacity (Number Head) 1,000 - 7,999 Percent	Standard Error	8,000 or More Percent	Standard Error	All Feedlots Percent	Standard Error
Tilmicosin (Micotil®)	59.2	(7.2)	79.6	(3.6)	70.3	(4.0)
Florfenicol (Nuflor®)	14.4	(5.0)	28.6	(4.5)	22.1	(3.4)
Ceftiofur (Naxcel®, Excenel®)	1.9	(1.1)	13.3	(2.9)	8.1	(1.7)
Oxytetracyclines (e.g., LA 200®, Biomycin®, Oxy-Tet100™)	31.2	(7.2)	32.5	(4.4)	31.9	(4.1)
Penicillins/Amoxicillin (e.g., PenG, Aquacillin™, Amoxi-Inject®)	9.6	(5.1)	9.9	(2.6)	9.8	(2.7)
Erythromycin (Gallamicin®)	0.0	(--)	0.8	(0.7)	0.4	(0.4)
Tylosin (Tylan®200)	3.4	(2.5)	3.0	(1.5)	3.2	(1.4)
Other antimicrobial (e.g., Spectinomycin)	2.4	(2.3)	2.1	(1.3)	2.2	(1.3)

Approximately two-thirds of the metaphylactically treated cattle in both large and small feedlots were administered tilmicosin. These cattle represent 6.7 percent of all cattle placed on feed. Oxytetracyclines were administered to 14.5 percent of metaphylactically treated cattle, and penicillins were administered to 13.0 percent. A total of 5.4 percent of cattle treated with injectable antimicrobials (0.6 percent of all cattle placed on feed) were metaphylactically treated with ceftiofur.

The list of antimicrobials in the table below is not mutually exclusive as cattle may have received metaphylactic treatment on more than one occasion, although this is unusual.

d. For cattle metaphylactically treated with injectable antimicrobials to prevent shipping fever, percent of ***cattle*** metaphylactically treated by injectable antimicrobial administered and by feedlot capacity:

	Percent Cattle					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Injectable Antimicrobial	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Tilmicosin (Micotil®)	65.0	(12.7)	64.8	(6.2)	64.9	(5.7)
Florfenicol (Nuflor®)	7.8	(3.8)	9.3	(3.2)	9.1	(2.8)
Ceftiofur (e.g., Naxcel®, Excenel®)	3.1	(1.8)	5.7	(2.2)	5.4	(2.0)
Oxytetracyclines (e.g., LA 200®, Biomycin®, Oxy-Tet100™)	12.0	(4.6)	14.9	(5.0)	14.5	(4.4)
Penicillins/Amoxicillin (e.g., PenG, Aquacillin™, Amoxi-Inject®)	18.5	(14.2)	12.3	(4.3)	13.0	(4.2)
Erythromycins (e.g., Gallimycin®)	0.0	(--)	0.2	(0.2)	0.2	(0.2)
Tylosin (Tylan®200)	0.2	(0.1)	2.5	(1.9)	2.3	(1.7)
Other antimicrobial (e.g., Spectinomycin)	0.6	(0.6)	0.4	(0.3)	0.4	(0.3)



Many factors may affect the likelihood that a group of animals will experience increased problems with bovine respiratory disease complex (BRD). The feedlot manager or animal health foreman decides if a group of animals should receive metaphylactic treatment. This decision is typically based on a set of criteria developed with veterinary consultation.

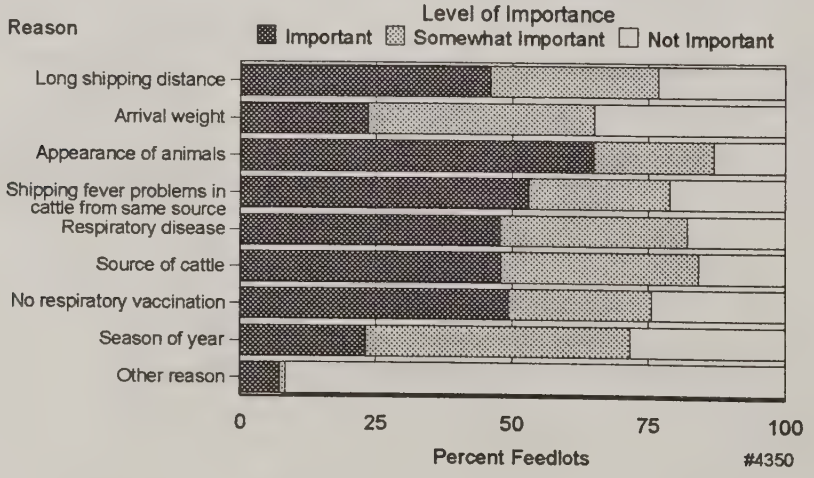
More than 60 percent of feedlots considered each of the reasons specified in the table below either ***important*** or ***somewhat important*** in the decision-making process for whether or not to metaphylactically treat a group of cattle. Approximately two-thirds of feedlots considered appearance of animals at arrival as an important criterion. Only one-quarter of feedlots considered arrival weight of cattle and season of year as important decision-making criteria.

e. Importance of criteria in decisions for metaphylaxis

i. Percent of feedlots by level of importance of criteria for preventative metaphylaxis (mass treatment) of cattle and calves against shipping fever:

	Percent Feedlots						
	Level of Importance						
	Important		Somewhat Important		Not Important		Total
Reason	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
Long shipping distance (increased shrink)	46.1	(3.1)	30.8	(3.1)	23.1	(2.8)	100.0
Arrival weight	23.5	(2.9)	41.7	(3.2)	34.8	(3.2)	100.0
Appearance of animals at arrival	65.0	(3.4)	21.9	(3.0)	13.1	(2.5)	100.0
Shipping fever problems in cattle previously received from the same source	53.1	(3.2)	25.9	(3.1)	21.0	(2.8)	100.0
Occurrence of respiratory disease in some of the cattle from the pen/group	47.8	(3.3)	34.3	(3.2)	17.9	(2.7)	100.0
Source of cattle	47.9	(3.2)	36.3	(3.2)	15.8	(2.6)	100.0
Known history of lack of vaccination against respiratory disease	49.3	(3.3)	26.3	(2.9)	24.4	(2.9)	100.0
Season of year	23.1	(2.5)	48.6	(3.4)	28.3	(3.2)	100.0
Other reason	7.3	(1.7)	1.0	(0.5)	91.7	(1.7)	100.0

Percent of Feedlots by Level of Importance of Criteria for Preventative Metaphylaxis of Cattle and Calves Against Shipping Fever



Large feedlots were more likely than small feedlots to consider five of the eight reasons specified in the table below (appearance, previous problems with cattle from the source, occurrence of respiratory disease, source of cattle, and season of the year) as important in deciding to metaphylactically treat a group of cattle against shipping fever. Slightly over 87 percent of large feedlots considered appearance of animals at arrival as important criteria for metaphylactic treatment, while 75.7 percent considered shipping fever problems in cattle previously received from the same source as important. Additionally, nearly two-thirds of large feedlots considered the source of the cattle and occurrence of respiratory disease important.

Note: Tables I.A.1.a & b show that a larger proportion of large feedlots than small feedlots employed metaphylaxis for some cattle placed and a larger percentage of cattle placed on large operations were given metaphylactic treatment.

ii. Percent of feedlots by level of importance of criteria for preventative metaphylaxis (mass treatment) of cattle and calves against shipping fever and by feedlot capacity:

	Percent Feedlots						
	Level of Importance and Feedlot Capacity (Number Head)						Total
	Important		Somewhat Important		Not Important		
Reason	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
1,000 - 7,999							
Long shipping distance (increased shrink)	45.2	(4.0)	28.3	(4.0)	26.5	(3.8)	100.0
Arrival weight	21.8	(3.8)	39.1	(4.2)	39.1	(4.3)	100.0
Appearance of animals at arrival	55.9	(4.5)	28.2	(4.2)	15.9	(3.5)	100.0
Shipping fever problems in cattle previously received from the same source	44.0	(4.3)	29.6	(4.2)	26.4	(3.8)	100.0
Occurrence of respiratory disease in some of the cattle from the pen/group	41.6	(4.3)	37.0	(4.3)	21.4	(3.6)	100.0
Source of cattle	40.6	(4.2)	39.7	(4.3)	19.7	(3.6)	100.0
Known history of lack of vaccination against respiratory disease	46.4	(4.3)	24.5	(3.8)	29.1	(4.0)	100.0 100.0
Season of year	19.1	(3.1)	49.6	(4.4)	31.3	(4.2)	100.0
Other reason	7.2	(2.2)	0.0	(--)	92.8	(2.2)	100.0
8,000 or More							
Long shipping distance (increased shrink)	48.2	(4.2)	37.0	(4.2)	14.8	(3.1)	100.0
Arrival weight	27.9	(3.7)	48.1	(4.2)	24.0	(3.6)	100.0
Appearance of animals at arrival	87.3	(2.8)	6.6	(2.2)	6.1	(1.9)	100.0
Shipping fever problems in cattle previously received from the same source	75.7	(3.5)	16.7	(3.0)	7.6	(2.1)	100.0
Occurrence of respiratory disease in some of the cattle from the pen/group	62.8	(4.2)	27.7	(4.0)	9.5	(2.3)	100.0
Source of cattle	65.7	(4.0)	28.0	(3.8)	6.3	(1.9)	100.0
Known history of lack of vaccination against respiratory disease	56.6	(4.2)	30.7	(4.1)	12.7	(2.9)	100.0
Season of year	33.0	(3.8)	46.2	(4.2)	20.8	(3.4)	100.0
Other reason	7.6	(2.2)	3.3	(1.7)	89.1	(2.7)	100.0

B. Therapeutic Treatment

1. Treatment for respiratory disease

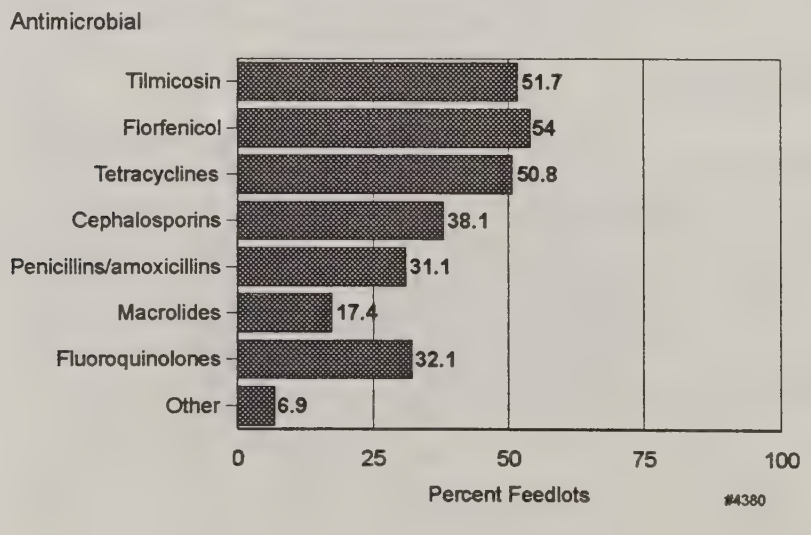
Early identification and treatment of bovine respiratory disease complex (BRD) with an appropriate antimicrobial provides feedlots the best opportunity to achieve a lasting cure.

Initial treatment of respiratory disease was defined as the first course of treatment used for an animal suspected to be suffering from respiratory disease. More than 50 percent of feedlots used florfenicol, tilmicosin, or tetracyclines as part of a first-time treatment for BRD for some cattle. Large feedlots were more likely than small feedlots to use either cephalosporins or fluoroquinolones.

a. Percent of feedlots that typically used the following antimicrobials as part of the initial treatment for respiratory disease by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Antimicrobial	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Tilmicosin (e.g., Micotil®)	49.5	(4.1)	57.5	(4.0)	51.7	(3.1)
Florfenicol (e.g., Nuflor®)	51.1	(4.1)	61.3	(4.0)	54.0	(3.1)
Tetracyclines (e.g., Oxy-Tet100™, LA 200®, Biomycin®)	50.4	(4.1)	52.0	(3.8)	50.8	(3.1)
Cephalosporins (e.g., Naxcel®, Excenel®)	32.8	(4.0)	51.6	(4.2)	38.1	(3.1)
Penicillins/amoxicillin (e.g., PenG, Aquacillin™, Amoxi-Inject®)	31.1	(3.9)	31.2	(3.9)	31.1	(3.0)
Macrolides (e.g., Gallamycin®, Tylan®200 [excludes Micotil®])	18.1	(3.5)	15.5	(2.9)	17.4	(2.6)
Fluoroquinolones (e.g., Baytril®)	23.2	(3.3)	55.2	(4.0)	32.1	(2.7)
Other	7.9	(2.2)	4.2	(1.6)	6.9	(1.6)
Any antimicrobial	100.0	(--)	100.0	(--)	100.0	(--)

Percent of Feedlots that Typically Used the Following Antimicrobials as Part of the Initial Treatment for Respiratory Disease

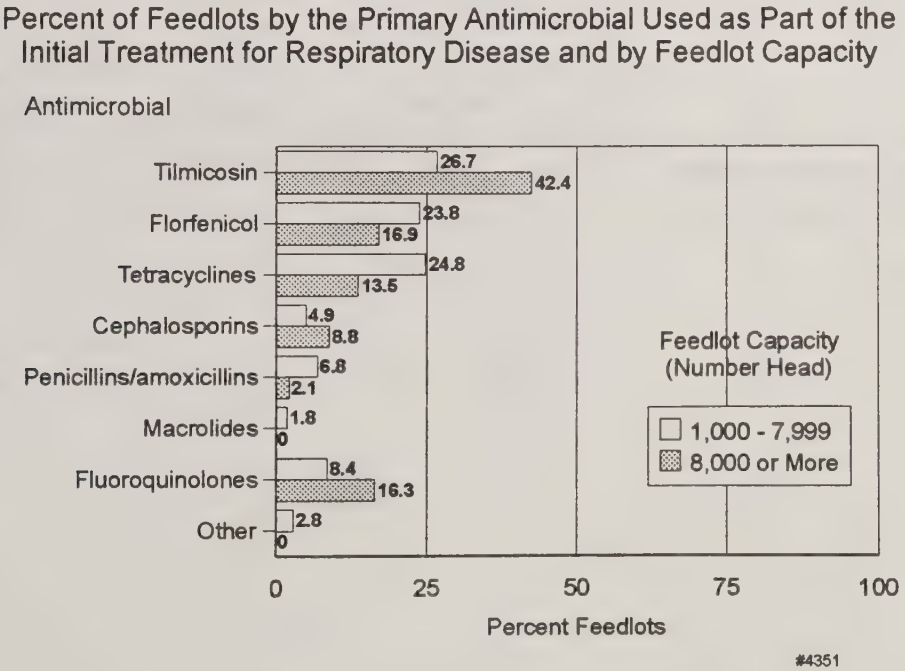


Tilmicosin, florfenicol, and tetracyclines were the primary antimicrobial drugs for the initial treatment of bovine respiratory disease complex (BRD). A higher percentage of large feedlots (42.4 percent) than small feedlots (26.7 percent) primarily used tilmicosin. Large feedlots were more likely than small feedlots to select a fluoroquinolone as the primary antimicrobial compound (16.3 percent compared to 8.4 percent).

Other antimicrobials may have included injectable sulfas and spectinomycin. Feedlots were limited to choosing one antimicrobial.

b. Percent of feedlots by the primary antimicrobial used as part of the initial treatment for respiratory disease and by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Antimicrobial	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Tilmicosin (e.g., Micotil®)	26.7	(3.4)	42.4	(4.2)	31.1	(2.7)
Florfenicol (e.g., Nuflor®)	23.8	(3.4)	16.9	(3.1)	21.9	(2.6)
Tetracyclines (e.g., Oxy-Tet100™, LA 200®, Biomycin®)	24.8	(3.3)	13.5	(2.9)	21.6	(2.4)
Cephalosporins (e.g., Naxcel®, Excenel®)	4.9	(1.8)	8.8	(2.2)	6.0	(1.5)
Penicillins/amoxicillin (e.g., PenG, Aquacillin™, Amoxi-Inject®)	6.8	(2.3)	2.1	(1.4)	5.5	(1.7)
Macrolides (e.g., Gallamycin®, Tylan®200 [excludes Micotil®])	1.8	(0.9)	0.0	(--)	1.3	(0.7)
Fluoroquinolones (e.g., Baytril®)	8.4	(2.3)	16.3	(2.8)	10.6	(1.8)
Other	2.8	(1.1)	0.0	(--)	2.0	(1.1)
Total	100.0		100.0		100.0	



A ***retreat*** was defined as an animal that failed to respond to the initial course of treatment for respiratory disease and required a second course of treatment. A ***repull*** is an animal that responded favorably to the initial course of treatment for respiratory disease, was returned to a pen, and received additional treatment for respiratory disease at a later date.

All small feedlots and nearly all large feedlots used antimicrobials in the therapeutic management of retreats and repulls.

c. Percent of feedlots that used antimicrobials to treat retreats and repulls for respiratory disease by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Animal Status	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Retreat for respiratory disease	100.0	(--)	99.1	(0.8)	99.7	(0.2)
Repull for respiratory disease	100.0	(--)	98.3	(1.1)	99.5	(0.3)

Of the feedlots that used antimicrobials as an initial course of treatment for respiratory disease, 84.6 percent changed their choice of antimicrobial when treating retreats and 72.5 percent changed their selection for treating repulls compared to initial treatment.

d. For feedlots that used antimicrobials to treat retreats and repulls for respiratory disease, percent of feedlots that selected a different antimicrobial for retreats and repulls than that used in their initial treatment for respiratory disease by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Animal Status	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Retreat for respiratory disease	82.5	(3.4)	90.1	(2.6)	84.6	(2.6)
Repull for respiratory disease	72.3	(3.7)	72.8	(3.8)	72.5	(2.9)

Higher percentages of feedlots chose florfenicol and tilmicosin as their primary antimicrobial drugs compared to other antimicrobials when treating retreats (32.2 and 25.0 percent, respectively) and repulls (34.6 and 22.2 percent, respectively). Fluoroquinolones were more likely to be used by large feedlots than small feedlots when treating repulls (20.7 percent compared to 8.4 percent).

e. For feedlots that changed antimicrobials for treating retreats and repulls for respiratory disease, percent of feedlots by primary antimicrobial used for treatment of retreats and repulls and by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Antimicrobial	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Retreats						
Tilmicosin (e.g., Micotil®)	27.7	(4.2)	18.9	(3.4)	25.0	(3.1)
Florfenicol (e.g., Nuflor®)	29.1	(4.2)	39.3	(4.3)	32.2	(3.2)
Tetracyclines (e.g., Oxy-Tet100™, LA 200®, Biomycin®)	12.0	(3.1)	5.4	(2.1)	10.1	(2.3)
Cephalosporins (e.g., Naxcel®, Excenel®)	7.8	(2.5)	10.3	(2.5)	8.5	(1.9)
Penicillins/amoxicillin (e.g., PenG, Aquacillin™, Amoxi-Inject®)	4.0	(1.4)	5.0	(1.9)	4.3	(1.1)
Macrolides (e.g., Gallamycin®, Tylan®200 [excludes Micotil®])	5.1	(2.2)	1.6	(1.0)	4.1	(1.6)
Fluoroquinolones (e.g., Baytril®)	9.8	(2.5)	18.4	(3.8)	12.3	(2.1)
Other antimicrobial	4.5	(1.6)	1.1	(0.8)	3.5	(1.2)
Total	100.0		100.0		100.0	
Repulls						
Tilmicosin (e.g., Micotil®)	24.9	(4.7)	15.5	(3.5)	22.2	(3.5)
Florfenicol (e.g., Nuflor®)	32.2	(4.8)	40.3	(4.7)	34.6	(3.6)
Tetracyclines (e.g., Oxy-Tet100™, LA 200®, Biomycin®)	13.4	(3.4)	5.1	(2.2)	11.0	(2.5)
Cephalosporins (e.g., Naxcel®, Excenel®)	10.8	(3.1)	13.9	(3.2)	11.7	(2.4)
Penicillins/amoxicillin (e.g., PenG, Aquacillin™, Amoxi-Inject®)	3.8	(1.9)	1.2	(0.9)	3.0	(1.4)
Macrolides (e.g., Gallamycin®, Tylan®200 [excludes Micotil®])	3.4	(2.0)	2.0	(1.2)	3.0	(1.5)
Fluoroquinolones (e.g., Baytril®)	8.4	(2.3)	20.7	(4.5)	11.9	(2.1)
Other antimicrobial	3.1	(1.4)	1.3	(1.0)	2.6	(1.1)
Total	100.0		100.0		100.0	

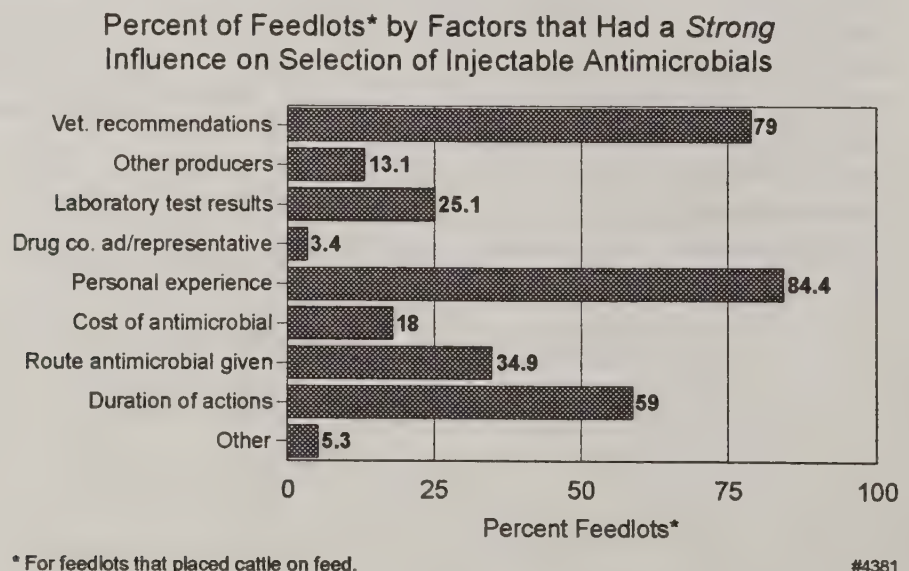
2. Selection of antimicrobials

Appropriate use of indicated antimicrobial drugs is important to effect a lasting cure. Several factors can influence the choice of specific antimicrobials. These factors vary from feedlot to feedlot.

Veterinarian recommendation and personal experience each had ***strong*** or ***moderate*** influence on selection of an antimicrobial for nearly 100 percent of feedlots. Nearly 90 percent of feedlots were influenced by the drug's duration of action (e.g., the drug only needed to be administered once). Laboratory test results influenced 58.8 percent of feedlots ***strongly*** or ***moderately***. Drug company advertisements/representative's recommendation, other producers, and cost of the antimicrobial each ***strongly*** influenced only a small percentage of feedlots.

a. Percent of feedlots by factors that influenced selection of injectable antimicrobials and by level of influence:

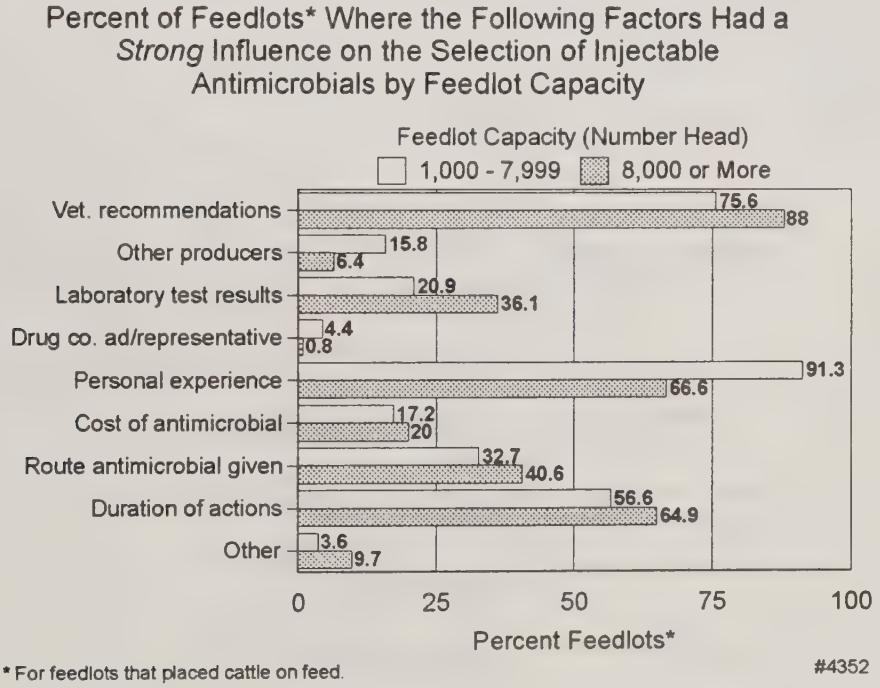
	Percent Feedlots						
	Level of Influence						
	Strong Influence		Moderate Influence		Little/No Influence		Total
Factor	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
Veterinarian recommendations	79.0	(2.7)	19.0	(2.6)	2.0	(0.7)	100.0
Other producers	13.1	(2.3)	49.7	(3.1)	37.2	(3.1)	100.0
Laboratory test results	25.1	(2.7)	33.7	(3.0)	41.2	(3.3)	100.0
Drug company advertisement or representative's recommendation	3.4	(1.3)	45.2	(3.3)	51.4	(3.3)	100.0
Personal experience	84.4	(1.8)	13.2	(1.6)	2.4	(0.9)	100.0
Cost of antimicrobial	18.0	(2.2)	49.0	(3.2)	33.0	(3.0)	100.0
Route by which antimicrobial can be given	34.9	(3.1)	40.4	(3.1)	24.7	(2.7)	100.0
Duration of actions (e.g., the need to give only once)	59.0	(3.3)	30.7	(3.0)	10.3	(2.2)	100.0
Other	5.3	(1.3)	2.6	(0.8)	92.1	(1.5)	100.0



Laboratory test results were more likely to ***strongly*** influence selection of antimicrobials on large feedlots than small feedlots. Small feedlots were more likely than large feedlots to choose an antimicrobial based on personal experience and other producers' recommendations.

i. Percent of feedlots where the following factors had a ***strong*** influence on the selection of injectable antimicrobials by feedlot capacity:

	Percent Feedlots			
	Feedlot Capacity			
	1,000 - 7,999 Head		8,000 or More Head	
Factor	Percent	Standard Error	Percent	Standard Error
Veterinarian recommendations	75.6	(3.5)	88.0	(2.8)
Other producers	15.8	(3.1)	6.4	(1.9)
Laboratory test results	20.9	(3.4)	36.1	(4.0)
Drug company advertisement or representative's recommendation	4.4	(1.8)	0.8	(0.6)
Personal experience	91.3	(1.9)	66.6	(4.1)
Cost of antimicrobial	17.2	(2.8)	20.0	(3.1)
Route by which antimicrobial can be given	32.7	(3.9)	40.6	(4.2)
Duration of actions (e.g., the need to give only once)	56.6	(4.2)	64.9	(4.2)
Other	3.6	(1.6)	9.7	(2.4)



3. Training in antimicrobial use

On-going training of personnel is an important quality assurance tool for companies across many types of industries. Appropriate use of antimicrobial drugs by feedlots is no exception.

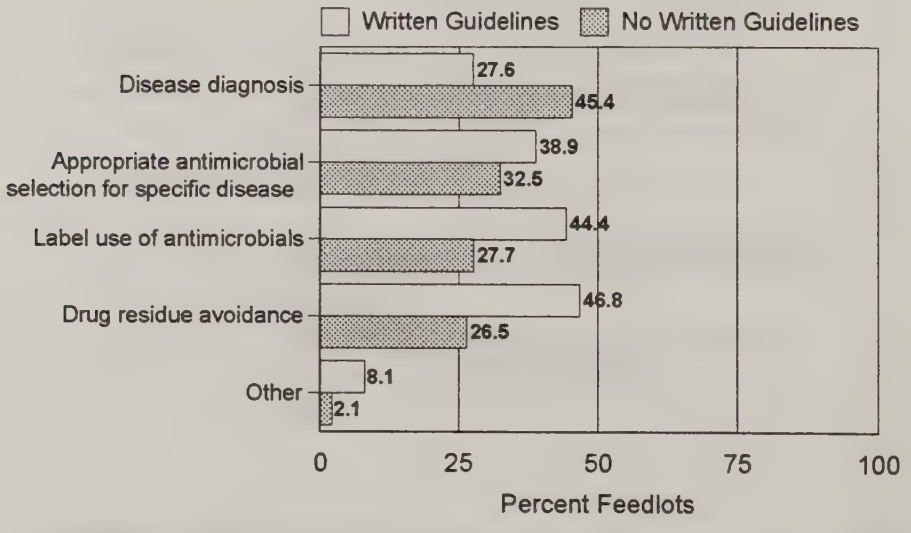
Almost three out of four feedlots provided formal training by qualified feedlot personnel, veterinary consultants, or drug company representatives in areas related to antimicrobial use. Nearly one-half of all feedlots included written guidelines with the formal training for both label use of antimicrobials and drug residue avoidance, while nearly one-half of all feedlots provided training on disease diagnosis without written guidelines.

a. Percent of feedlots that provided formal training programs conducted by qualified feedlot personnel, veterinary consultant, drug company representative, etc., in the following areas of antimicrobial use by level of training:

Percent Feedlots

	Level of Training								
	Formal With Written Guidelines		Formal Without Written Guidelines		No Training Done		Not Applicable (No Employees)		Total
Area of Training	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
Disease diagnosis	27.6	(2.3)	45.4	(3.2)	18.3	(2.7)	8.7	(1.9)	100.0
Appropriate antimicrobial selection for specific disease	38.9	(2.4)	32.5	(3.1)	19.9	(2.7)	8.7	(1.9)	100.0
Label use of antimicrobials	44.4	(2.5)	27.7	(3.0)	19.2	(2.7)	8.7	(1.9)	100.0
Drug residue avoidance	46.8	(2.4)	26.5	(3.0)	18.0	(2.6)	8.7	(1.9)	100.0
Other	8.1	(1.6)	2.1	(0.9)	81.1	(2.6)	8.7	(1.9)	100.0

Percent of Feedlots that Provided Formal Training Programs* on Antimicrobial Use by Use of Written Guidelines



* By qualified feedlot personnel, veterinary consultant, drug company representative, etc. #4382

C. Antimicrobials

1. Antimicrobials used in feed or water

Antimicrobials are added to feed or water of feedlot cattle for a number of purposes, such as a therapeutic response to an outbreak of respiratory disease, disease prevention, to aid in controlling liver abscessation, or to increase average daily gains and/or improve dry matter conversion. Choices of antimicrobial and duration of administration depend on the desired effect.

Over one-half (51.9 percent) of all feedlots administered chlortetracycline in the feed or water to some cattle as a health or production management tool. Additionally, 16.8 percent administered chlortetracycline/sulfamethazine and 19.3 percent administered oxytetracycline to some cattle. Whereas small feedlots were more likely to utilize tetracyclines, large feedlots were more likely than small feedlots to use tylosin (41.5 compared to 12.1 percent, respectively). Nearly 17 percent of feedlots used no antimicrobials in feed or water for any cattle placed during the year ending June 30, 1999.

The antimicrobial list in the following table is not mutually exclusive as feedlots may have used more than one antimicrobial during the year ending June 30, 1999. (See Appendix 2 for more discussion. Population estimates of feedlots that fed ionophores and anticoccidials are also presented in Feedlot '99 Part I.)

a. Percent of feedlots that used the following antimicrobials in feed or water as a health or production management tool by antimicrobial used and by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Antimicrobial	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	0.0	(--)	0.0	(--)	0.0	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	54.0	(4.1)	46.7	(4.0)	51.9	(3.1)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	19.3	(3.6)	10.6	(2.5)	16.8	(2.7)
Neomycin (e.g., Biosol®, Neomix® 325)	0.0	(--)	1.8	(0.8)	0.5	(0.2)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	20.5	(3.5)	16.3	(3.1)	19.3	(2.7)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	2.4	(1.4)	3.7	(1.4)	2.7	(1.1)
Tetracycline (e.g., Tetrasure™, T-Vet®)	3.0	(1.7)	2.8	(1.4)	2.9	(1.3)
Tylosin (e.g., Tylan®)	12.1	(2.3)	41.5	(3.7)	20.3	(2.0)
Virginiamycin (e.g., V Max®)	0.3	(0.2)	0.8	(0.6)	0.4	(0.2)
Other	0.0	(--)	0.0	(--)	0.0	(--)
Any antimicrobial	85.2	(2.9)	77.9	(3.3)	83.2	(2.3)

Both large and small feedlots were more likely to administer tetracyclines to cattle weighing less than 700 lbs. at arrival than those weighing 700 lbs. or greater. Feedlots appear to have been just as likely to feed tylosin to cattle weighing greater than 700 lbs. at placement as those weighing less than 700 lbs.

Antimicrobials listed in the following table are not mutually exclusive as feedlots may have used more than one antimicrobial in feed or water during the year ending June 30, 1999.

i. Of the feedlots that placed some cattle of the weights indicated below, percent of feedlots that used the following antimicrobials in feed or water as a health or production management tool by antimicrobial used, feedlot capacity, and by arrival weight:

	Percent Feedlots by Arrival Weight					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Antimicrobial	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Cattle with an Arrival Weight of Less than 700 lbs.[1]						
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	0.0	(--)	0.0	(--)	0.0	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	56.8	(4.6)	48.3	(4.1)	54.2	(3.4)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	20.4	(4.0)	11.0	(2.6)	17.4	(2.9)
Neomycin (e.g., Biosol®, Neomix® 325)	0.0	(--)	0.0	(--)	0.0	(--)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	21.4	(4.0)	16.8	(3.2)	20.0	(2.9)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	2.1	(1.6)	3.8	(1.5)	2.6	(1.2)
Tetracycline (e.g., Tetrasure™, T-Vet®)	0.8	(0.7)	1.8	(1.1)	1.1	(0.6)
Tylosin (e.g., Tylan®)	9.5	(2.4)	39.5	(3.8)	18.9	(2.1)
Virginiamycin (e.g., V Max®)	0.3	(0.2)	0.0	(--)	0.2	(0.2)
Other	0.0	(--)	0.0	(--)	0.0	(--)
Any antimicrobial	86.7	(2.9)	77.7	(3.4)	83.9	(2.2)
Cattle with an Arrival Weight of 700 lbs. or More[2]						
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	0.0	(--)	0.0	(--)	0.0	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	33.8	(3.9)	34.5	(4.1)	34.0	(2.9)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	9.4	(2.8)	5.4	(1.9)	8.2	(2.0)
Neomycin (e.g., Biosol®, Neomix® 325)	0.0	(--)	1.8	(0.9)	0.6	(0.3)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	14.0	(3.2)	9.1	(2.4)	12.5	(2.3)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	0.8	(0.7)	1.8	(0.9)	1.1	(0.5)
Tetracycline (e.g., Tetrasure™, T-Vet®)	2.8	(1.9)	2.9	(1.5)	2.8	(1.4)
Tylosin (e.g., Tylan®)	13.7	(2.6)	42.3	(3.8)	22.4	(2.2)
Virginiamycin (e.g., V Max®)	0.3	(0.2)	0.9	(0.7)	0.5	(0.3)
Other	0.0	(--)	0.0	(--)	0.0	(--)
Any antimicrobial	60.6	(4.5)	66.3	(3.8)	62.4	(3.3)

1 For feedlots that placed cattle with an arrival weight of less than 700 lbs. (Feedlot '99 Part I)

2 For feedlots that placed cattle with an arrival weight of 700 lbs. or more. (Feedlot '99 Part I)

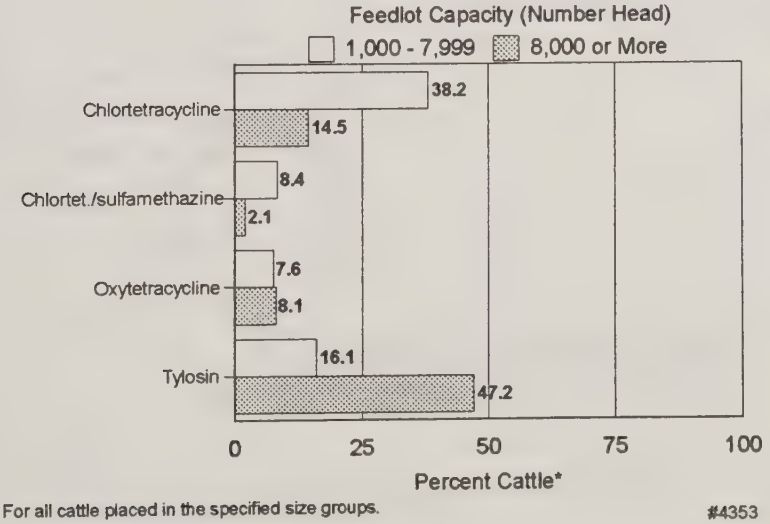
Higher percentages of cattle on small feedlots than on large feedlots were administered chlortetracycline and chlortetracycline/sulfamethazine in their feed or water. Similar percentages of cattle on large and small feedlots were administered oxytetracycline. Almost one-half (47.2 percent) of cattle on large feedlots were fed tylosin, whereas only 16.1 percent of cattle on small feedlots were fed this antimicrobial. Overall, 42.3 percent of cattle received tylosin in their ration.

Antimicrobials listed in the following table are not mutually exclusive as cattle may have been administered more than one antimicrobial during their time on feed. (Population estimates of feedlots that fed ionophores and anticoccidials are presented Feedlot '99 Part I.)

b. For all cattle placed in the specified feedlot size groups, percent of ***cattle*** that received each of the following antimicrobials in the feed or water as a health or production tool by feedlot capacity:

	Percent Cattle					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Type of Antibiotic	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	0.0	(--)	0.0	(--)	0.0	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	38.2	(3.7)	14.5	(3.1)	18.2	(2.7)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	8.4	(2.2)	2.1	(0.9)	3.1	(0.8)
Neomycin (e.g., Biosol®, Neomix® 325)	0.0	(--)	0.2	(0.1)	0.2	(0.1)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	7.6	(1.6)	8.1	(2.7)	8.0	(2.3)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	0.0	(0.0)	0.4	(0.3)	0.3	(0.2)
Tetracycline (e.g., Tetrasure™, T-Vet®)	1.0	(0.7)	1.3	(0.8)	1.3	(0.7)
Tylosin (e.g., Tylan®)	16.1	(3.1)	47.2	(5.7)	42.3	(4.9)
Virginiamycin (e.g., V Max®)	0.3	(0.2)	0.0	(0.0)	0.1	(0.0)
Other	0.0	(--)	0.0	(--)	0.0	(--)

Percent of Cattle* that Received Each of the Following Antimicrobials in the Feed or Water as a Health or Production Tool by Feedlot Capacity



* For all cattle placed in the specified size groups.

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The percentage of cattle receiving each of the antimicrobials listed below was similar regardless of arrival weight when comparing cattle of less than 700 lbs. to those 700 lbs. or more.

i. For cattle placed in the specified size groups, percent of cattle that received each of the following antimicrobials in the feed or water as a health or production management tool by feedlot capacity and by arrival weight:

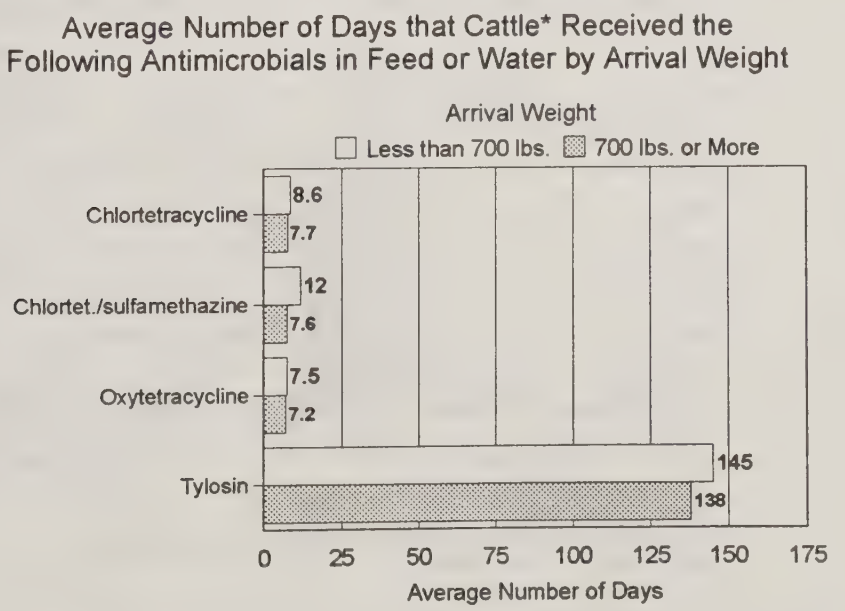
	Percent Cattle by Arrival Weight					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Type of Antibiotic	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Cattle with an Arrival Weight of Less than 700 lbs.						
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	0.0	(--)	0.0	(--)	0.0	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	43.4	(4.7)	14.1	(2.5)	18.8	(2.4)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	10.8	(2.9)	1.7	(0.6)	3.2	(0.7)
Neomycin (e.g., Biosol®, Neomix® 325)	0.0	(--)	0.0	(--)	0.0	(--)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	10.6	(2.4)	9.6	(3.5)	9.7	(3.0)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	0.0	(0.0)	0.5	(0.3)	0.4	(0.3)
Tetracycline (e.g., Tetrasure™, T-Vet®)	0.9	(0.8)	1.4	(0.9)	1.3	(0.8)
Tylosin (e.g., Tylan®)	9.9	(2.7)	44.9	(6.0)	39.3	(5.3)
Virginiamycin (e.g., V Max®)	0.3	(0.2)	0.0	(--)	0.0	(0.0)
Other	0.0	(--)	0.0	(--)	0.0	(--)
Cattle with an Arrival Weight of 700 lbs. or More						
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	0.0	(--)	0.0	(--)	0.0	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	34.0	(4.9)	14.8	(3.9)	17.7	(3.4)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	6.4	(2.4)	2.3	(1.3)	2.9	(1.1)
Neomycin (e.g., Biosol®, Neomix® 325)	0.0	(--)	0.3	(0.2)	0.3	(0.2)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	5.1	(1.5)	6.8	(3.0)	6.6	(2.6)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	0.0	(0.0)	0.3	(0.2)	0.3	(0.2)
Tetracycline (e.g., Tetrasure™, T-Vet®)	1.2	(1.0)	1.3	(0.9)	1.3	(0.8)
Tylosin (e.g., Tylan®)	21.3	(4.3)	49.2	(5.9)	44.8	(5.1)
Virginiamycin (e.g., V Max®)	0.3	(0.2)	0.0	(0.0)	0.1	(0.0)
Other	0.0	(--)	0.0	(--)	0.0	(--)

2. Length of antimicrobial use

Tetracyclines were fed between 4 and 12 days, on average, whereas tylosin was fed for a longer time period, likely because the desired purpose differs depending on which antimicrobials were administered. Tetracyclines are often used to prevent or treat outbreaks of respiratory disease, while tylosin is fed to reduce the occurrence of liver abscessation. Tylosin is primarily fed for most of, if not the entire, duration of the feeding period.

a. For feedlots that used the specified antimicrobials in the feed or water as a health or production management tool, average number of days that cattle received the following antimicrobials in feed or water by arrival weight:

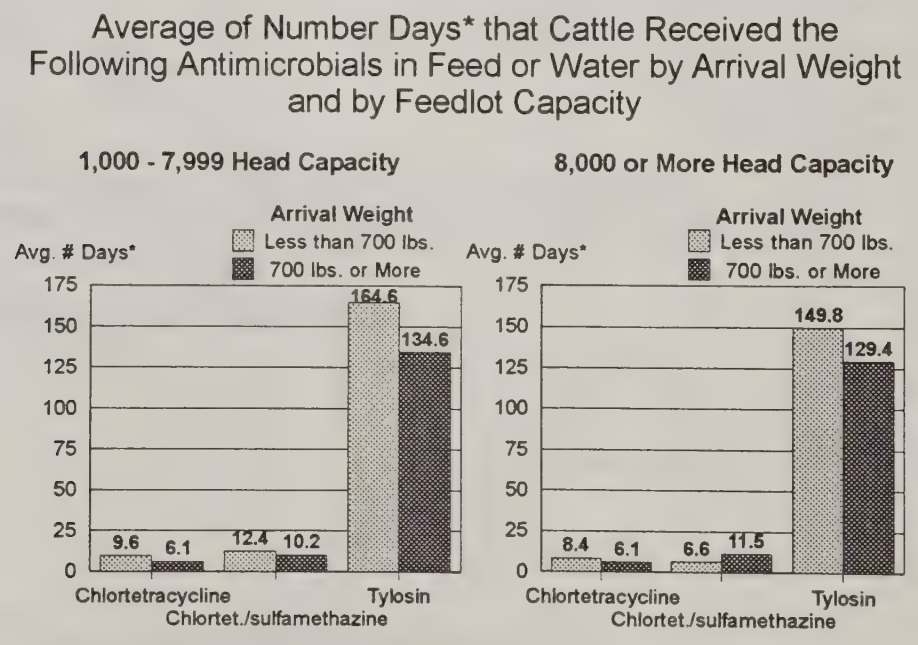
	Average Number Days			
	Arrival Weight			
	Less than 700 lbs.		700 lbs. or More	
Type of Antibiotic	Number Days	Standard Error	Number Days	Standard Error
Bacitracin (e.g., BMD®, Fortracin®, Alloac®)	--	(--)	--	(--)
Chlortetracycline (e.g., Aureomycin® 100, CTC)	8.6	(1.3)	7.7	(1.1)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	12.0	(1.2)	7.6	(0.9)
Neomycin (e.g., Biosol®, Neomix® 325)	--	(--)	20.8	(8.1)
Oxytetracycline (e.g., OTC, Terramycin®, TM 50)	7.5	(1.1)	7.2	(1.5)
Sulfamethazine/sulfadimethoxine (e.g., Albon®, Sulmet®)	8.1	(1.0)	10.4	(3.4)
Tetracycline (e.g., Tetrasure™, T-Vet®)	7.4	(1.4)	4.3	(0.2)
Tylosin (e.g., Tylan®)	145.0	(4.7)	138.0	(4.4)
Virginiamycin (e.g., V Max®)	130.0	(--)	124.5	(2.8)
Other antimicrobial	--	(--)	--	(--)



Small feedlots administered tylosin for longer periods than large feedlots regardless of arrival weight. However, large feedlots administered chlortetracycline/sulfamethazine to cattle weighing greater than 700 lbs. for an average of 11.5 days, and small feedlots administered this combination for an average of 6.6 days.

i. For feedlots that used the specified antimicrobials in the feed or water as a health or production management tool, average number of days that cattle received the following antimicrobials in feed or water by feedlot capacity and by arrival weight:

	Average Number Days by Arrival Weight			
	Feedlot Capacity (Number Head)			
	1,000 - 7,999		8,000 or More	
Type of Antibiotic	Number Days	Standard Error	Number Days	Standard Error
Cattle with an Arrival Weight of Less than 700 lbs.				
Chlortetracycline (e.g., Aureomycin® 100, CTC)	9.6	(1.8)	6.1	(0.4)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	12.4	(1.4)	10.2	(1.9)
Tylosin (e.g., Tylan®)	164.6	(7.4)	134.6	(5.7)
Cattle with an Arrival Weight of 700 lbs. or More				
Chlortetracycline (e.g., Aureomycin® 100, CTC)	8.4	(1.6)	6.1	(0.6)
Chlortetracycline/sulfamethazine (e.g., Aureo S 700®, MoorMan's® Beef Cattle Boost)	6.6	(0.8)	11.5	(2.1)
Tylosin (e.g., Tylan®)	149.8	(8.8)	129.4	(2.6)



* For feedlots that used the specified antimicrobials in the feed or water as a health or production management tool.

#4355

D. Management of Sick Cattle

1. Disease conditions

The following table presents the percentage of feedlots that had at least one placement develop the specific disease conditions listed below during the year ending June 30, 1999. Estimates include animals that required medical treatment or removal from their home pen, those that died with or without treatment, and those that recovered and were shipped (realized) prior to harvest weight. Estimates are based on producer reports.

Almost all small feedlots (96.7 percent) and all large feedlots had at least one case of respiratory disease. Large feedlots were more likely than small feedlots to have had at least one animal develop acute interstitial pneumonia, a digestive problem, buller steer syndrome, and a central nervous system problem.

a. For feedlots that placed cattle on feed, percent of ***feedlots*** that had at least one animal develop the following disease conditions after arrival by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Disease Condition	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Respiratory disease such as shipping fever	96.7	(1.5)	100.0	(--)	97.6	(1.1)
Acute interstitial pneumonia	74.0	(3.6)	89.4	(2.5)	78.4	(2.7)
Digestive problems (excluding non-eaters)	67.0	(3.9)	97.1	(1.5)	78.5	(2.9)
Bullers	65.0	(3.9)	91.4	(2.4)	72.4	(2.9)
Lameness	90.1	(2.5)	96.6	(1.5)	92.0	(1.8)
Central nervous system problems	58.8	(4.0)	86.0	(2.9)	66.4	(3.0)

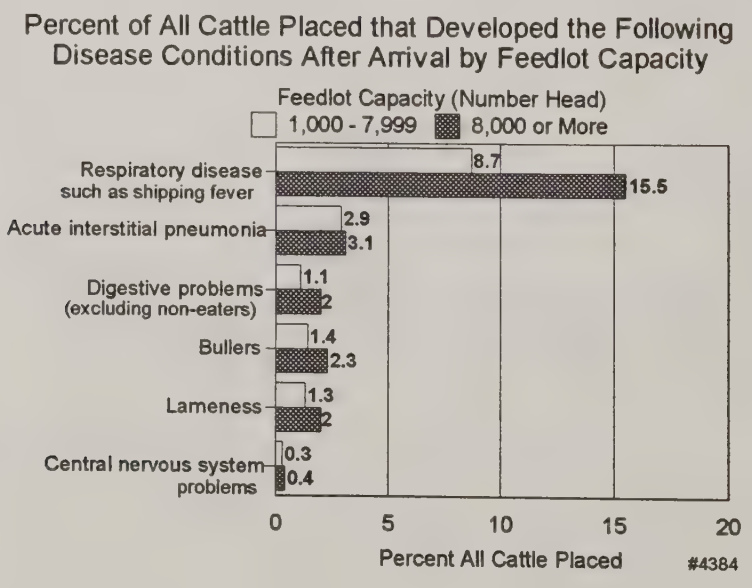
Bovine respiratory disease complex (BRD) was the most common cause of illness in cattle on both large and small feedlots. This disease was more likely to be seen in cattle on large feedlots (15.5 percent of cattle) compared to small feedlots (8.7 percent of cattle). The cause of the difference in proportion of cattle affected on large and small feedlots is not clear. For the same time period, 1.3 percent of cattle on large feedlots and 0.9 percent of cattle on small feedlots died (Feedlot '99 Part I) and 19.0 percent of cattle received an antimicrobial injection (Feedlot '99 Part II). It is likely that the largest use for injectable antimicrobials is for treatment and control of BRD.

Acute interstitial pneumonia is an often fatal disease of cattle, and there is much speculation regarding the cause. Care should be taken when interpreting these results as signs of acute interstitial pneumonia can be similar to severe cases of bovine respiratory disease complex (shipping fever). A definitive diagnosis of acute interstitial pneumonia requires postmortem examination of tissues. It is possible that the estimate of animals affected with acute interstitial pneumonia (3.1 percent) is inaccurate due to misclassification.

Cattle on large feedlots were more likely than those on small feedlots to have developed digestive problems. Approximately 2 percent of all cattle developed these problems.

i. Percent of all ***cattle*** placed that developed the following disease conditions after arrival by feedlot capacity:

	Percent Cattle					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Disease Condition	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Respiratory disease such as shipping fever	8.7	(0.7)	15.5	(4.7)	14.4	(4.0)
Acute interstitial pneumonia	2.9	(0.4)	3.1	(0.4)	3.1	(0.3)
Digestive problems (excluding non-eaters)	1.1	(0.1)	2.0	(0.3)	1.9	(0.3)
Bullers	1.4	(0.2)	2.3	(0.4)	2.2	(0.3)
Lameness	1.3	(0.2)	2.0	(0.9)	1.9	(0.8)
Central nervous system problems	0.3	(0.1)	0.4	(0.1)	0.4	(0.1)



2. Treatment of disease conditions

Almost all feedlots (99.8 percent) used an injectable antimicrobial as part of an initial therapeutic regimen for an animal believed to be suffering from a respiratory disease. Approximately 40 percent of feedlots typically used a respiratory vaccine and a similar percentage of feedlots used a non-steroidal anti-inflammatory drug (NSAID) in addition to antimicrobials. Between one-fifth and one-third of all feedlots used an oral antimicrobial, vitamin B injection, corticosteroid, antihistamine, probiotic paste, and some sort of oral electrolytes/fluids. It appears that, on some feedlots, the initial treatment for respiratory disease may have included an injectable antimicrobial and an oral antimicrobial. Interestingly, 22.3 percent of feedlots typically used corticosteroids, a potent anti-inflammatory but also an immunosuppressant, as part of the initial treatment of respiratory disease.

Injectable antimicrobials were typically used by less than one-third of feedlots as part of an initial treatment for digestive disorders. The most common inclusion to treat digestive problems, a probiotic paste, was used by 45.6 percent of feedlots. Other common products administered were an oral antimicrobial (19.6 percent), vitamin B injection (20.9 percent), and oral electrolytes/fluids/drenches (32.9 percent). The Other product category likely included detergent-type compounds, laxatives, and addition of hay to the ration.

Over 90 percent of feedlots used an injectable antimicrobial as part of the initial treatment for lameness. Other common therapeutics included an oral antimicrobial (32.5 percent of feedlots), corticosteroid (26.6 percent), and NSAID (17.2 percent).

a. Percent of feedlots by products usually given to cattle as part of an initial course of treatment for the following medical conditions:

	Percent Feedlots					
	Medical Condition					
	Respiratory Disease (i.e., Shipping Fever)		Digestive Problems (Excluding Non-eaters)		Lameness	
Therapeutic Product	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Injectable antimicrobial	99.8	(0.2)	31.3	(3.0)	90.2	(2.0)
Oral antimicrobial	27.0	(3.1)	19.6	(2.3)	32.5	(2.7)
Vitamin C injection	8.9	(1.6)	3.9	(0.9)	2.6	(0.8)
Vitamin B injection	31.4	(3.1)	20.9	(2.6)	7.4	(1.7)
Respiratory vaccination (e.g., IBR)	40.6	(2.9)	N/A	N/A	N/A	N/A
Corticosteroid (e.g., dexamethasone, Azium®)	22.3	(2.5)	6.4	(1.4)	26.6	(2.6)
Non-steroidal anti-inflammatory drug (e.g., Banamine®, aspirin)	40.5	(3.1)	8.4	(1.6)	17.2	(2.1)
Antihistamine	33.3	(2.7)	7.3	(1.3)	3.1	(1.0)
Anthelminthic (dewormer)	8.3	(1.8)	7.5	(1.7)	1.0	(0.8)
Probiotic paste	29.5	(3.1)	45.6	(3.1)	3.3	(1.1)
Oral electrolytes, fluids, drenches	23.9	(2.7)	32.9	(2.7)	2.6	(0.8)
Other product	1.5	(0.8)	16.6	(2.0)	2.4	(0.7)

Large feedlots were less likely to use an oral antimicrobial than small feedlots for the initial treatment of respiratory disease and more likely to use an oral antimicrobial for the treatment of digestive disorders. (See Table I.C.1.b for information on the primary antimicrobials used.) Large feedlots were more likely than small feedlots to use a corticosteroid or a non-steroidal anti-inflammatory drug (NSAID) as part of an initial treatment for lameness. Large feedlots were also more likely than small feedlots to administer a respiratory vaccine, such as IBR, to animals that were believed to have a respiratory disease.

i. Percent of feedlots by products usually given to cattle as part of an initial course of treatment for the following medical conditions and by feedlot capacity:

	Percent Feedlots					
	Medical Condition and Feedlot Capacity (Number Head)					
	Respiratory Disease (i.e., Shipping Fever)		Digestive Problems (Excluding Non-eaters)		Lameness	
Therapeutic Product	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error
1,000 - 7,999						
Injectable antimicrobial	99.8	(0.2)	31.4	(3.9)	90.9	(2.5)
Oral antimicrobial	31.1	(4.1)	16.4	(2.9)	35.4	(3.5)
Vitamin C injection	6.1	(1.8)	3.7	(1.2)	2.2	(0.9)
Vitamin B injection	31.8	(4.1)	22.4	(3.5)	7.2	(2.2)
Respiratory vaccination (e.g., IBR)	31.5	(3.7)	N/A	N/A	N/A	N/A
Corticosteroid (e.g., dexamethasone, Azium®)	20.4	(3.1)	5.1	(1.8)	21.9	(3.3)
Non-steroidal anti-inflammatory (e.g., Banamine®, aspirin)	37.7	(4.0)	6.0	(1.9)	11.7	(2.6)
Antihistamine	31.6	(3.4)	4.5	(1.4)	3.6	(1.3)
Anthelminthic (dewormer)	8.7	(2.4)	6.8	(2.3)	1.2	(1.1)
Probiotic paste	31.9	(4.0)	46.5	(4.1)	3.2	(1.4)
Oral electrolyte, fluids, drenches	20.2	(3.4)	28.2	(3.4)	2.0	(0.9)
Other product	1.3	(1.1)	14.6	(2.6)	2.3	(0.9)
8,000 or More						
Injectable antimicrobial	100.0	(--)	30.9	(3.6)	88.3	(2.7)
Oral antimicrobial	16.5	(3.1)	27.9	(3.6)	25.1	(3.8)
Vitamin C injection	16.0	(3.2)	4.4	(1.1)	3.6	(1.4)
Vitamin B injection	30.3	(3.6)	17.0	(2.9)	8.2	(2.3)
Respiratory vaccination (e.g., IBR)	64.1	(3.9)	N/A	N/A	N/A	N/A
Corticosteroid (e.g., dexamethasone, Azium®)	27.1	(3.7)	9.8	(2.2)	38.6	(3.9)
Non-steroidal anti-inflammatory (e.g., Banamine®, aspirin)	47.6	(4.1)	14.5	(2.9)	31.3	(3.7)
Antihistamine	37.5	(4.0)	14.5	(2.7)	2.0	(1.2)
Anthelminthic (dewormer)	7.1	(2.0)	9.2	(2.0)	0.6	(0.6)
Probiotic paste	23.1	(3.5)	43.3	(4.0)	3.8	(1.6)
Oral electrolytes, fluids, drenches	33.4	(3.9)	44.8	(4.0)	4.3	(1.6)
Other product	1.8	(1.1)	21.6	(3.3)	2.6	(1.2)

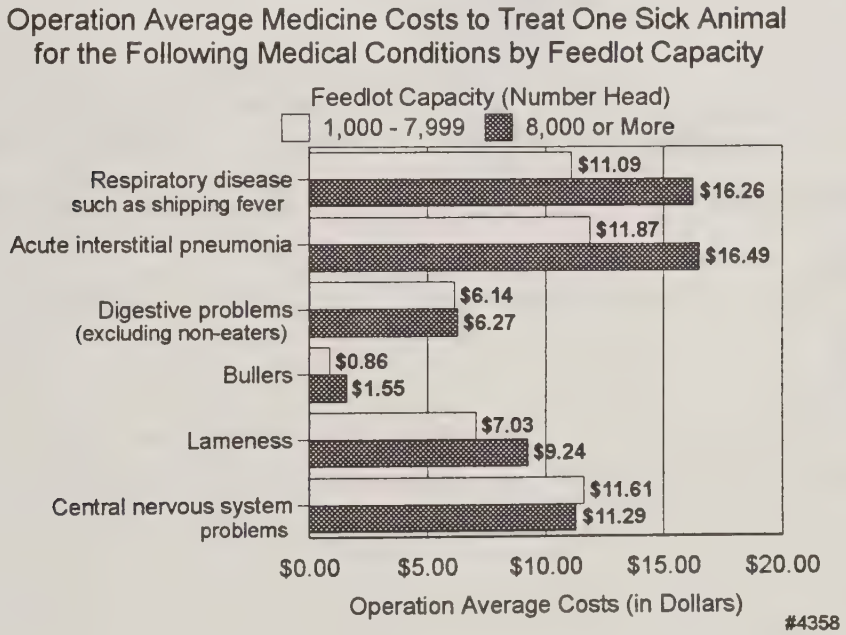
3. Costs of treating disease conditions

Estimates of costs to treat one sick animal in the table below included costs of medicines and related items, such as syringes, but did not include veterinary, labor, or other, similar charges. Retreatment costs were also included.

Acute interstitial pneumonia, respiratory diseases, and central nervous system problems had the highest costs to treat one sick animal. Treatment costs for both respiratory categories were higher for larger feedlots than small feedlots ($16.26 compared to $11.09 for respiratory disease and $16.49 compared to $11.87 for acute interstitial pneumonia).

a. Operation average medicine costs (in dollars) to treat one sick animal for the following medical conditions by feedlot capacity:

	Operation Average Cost (In Dollars)					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Medical Condition	Cost	Standard Error	Cost	Standard Error	Cost	Standard Error
Respiratory disease such as shipping fever	$11.09	($0.62)	$16.26	($0.77)	$12.59	($0.49)
Acute interstitial pneumonia	$11.87	($0.58)	$16.49	($0.86)	$13.33	($0.48)
Digestive problems (excluding non-eaters)	$6.14	($0.83)	$6.27	($0.36)	$6.19	($0.56)
Bullers	$0.86	($0.18)	$1.55	($0.23)	$1.10	($0.14)
Lameness	$7.03	($0.71)	$9.24	($0.55)	$7.68	($0.53)
Central nervous system problems	$11.61	($1.02)	$11.29	($0.71)	$11.50	($0.72)



4. Treatment locality protocol

Almost all small feedlots (95.6 percent) and all large feedlots had a hospital pen or area for treatment or housing of sick animals.

a. Percent of feedlots with a hospital pen or area by feedlot capacity:

Percent Feedlots

Feedlot Capacity (Number Head) 1,000 - 7,999		8,000 or More		All Feedlots	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
95.6	(1.8)	100.0	(--)	96.9	(1.3)

Treatment locality protocols listed in the following table are not mutually exclusive as feedlots may ***sometimes*** treat an animal in a hospital area and leave it in a hospital pen for 24 hours or more, return the treated animal to the home pen in less than 24 hours, and treat some animals in their home pen or associated alley. Typically, feedlots that answered ***always*** for a one category did not answer ***usually*** or ***always*** for another category.

Three-fourths (74.8 percent) of feedlots ***always*** or ***usually*** treated animals in a hospital area and kept them in a hospital pen for 24 hours or more. Few feedlots (13.3 percent) ***always*** or ***usually*** treated animals and returned them to their home pen within 24 hours. Additionally, 93.8 percent of feedlots only ***sometimes*** or ***never*** treated animals in their home pen or alley.

b. Percent of feedlots by treatment locality protocol:

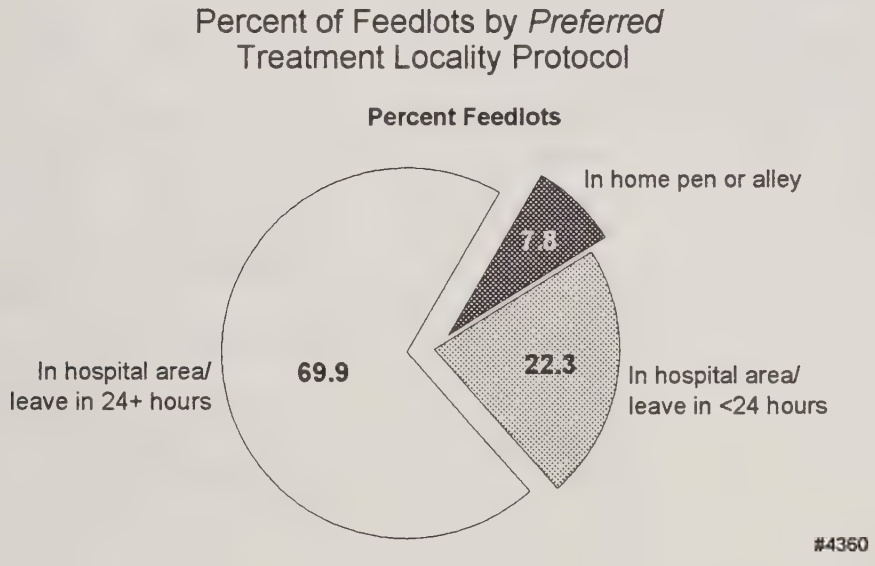
Percent Feedlots

	Frequency of Treatment Protocol										
	Always		Usually		Sometimes		Never		No Hospital Pen		Total
Treatment Locality Protocol	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent
Treat in hospital area and leave animals in hospital pen for 24 hours or more	48.5	(3.2)	26.3	(2.8)	21.2	(2.7)	0.9	(0.4)	3.1	(1.3)	100.0
Treat in hospital area and remove animals from the hospital pen in less than 24 hours	0.7	(0.4)	12.6	(2.4)	38.9	(3.0)	44.7	(3.1)	3.1	(1.3)	100.0
Treat in home pen or an alley	2.5	(1.2)	3.7	(1.4)	25.6	(2.7)	68.2	(3.0)	N/A	N/A	100.0

Overall, 69.9 percent of feedlots preferred to treat animals in a hospital pen/area and leave them in a hospital pen for 24 hours or more. Only 7.8 percent of feedlots preferred to treat animals in a home pen or alley.

c. Percent of feedlots by ***preferred*** treatment locality protocol and by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Preferred Treatment Locality Protocol	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Treat in hospital area and leave animals in hospital pen for 24 hours or more	71.4	(3.7)	65.8	(4.0)	69.9	(2.9)
Treat in hospital area and remove animals from the hospital pen in less than 24 hours	21.5	(3.2)	24.4	(3.8)	22.3	(2.5)
Treat in home pen or an alley	7.1	(2.1)	9.8	(2.4)	7.8	(1.6)
Total	100.0		100.0		100.0	



Small feedlots were more likely than large feedlots to provide animals in hospital pens/areas with increased bunk space (compared to the home pen), wind breaks, and shade. On the other hand, large feedlots were more likely than small feedlots to provide cattle in a hospital pen/area with additional hay than they would have in the home pen. Overall, 92.9 percent of feedlots provided additional hay for cattle in a hospital pen/area.

d. For feedlots that had a hospital pen or area, percent of feedlots that provided the following resources to cattle in the hospital pen or area by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Resources in Hospital Pen or Area	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Wind breaks	90.9	(2.0)	67.7	(3.7)	84.2	(1.7)
Shade	72.5	(3.4)	55.5	(4.1)	67.6	(2.7)
Sprinklers/misters to keep cattle cool	13.2	(2.5)	30.3	(4.0)	18.1	(2.2)
Additional bedding (e.g., straw, newspaper) compared to home pen	71.5	(3.5)	77.6	(3.2)	73.3	(2.7)
Additional hay to eat compared to home pen	90.7	(2.0)	98.4	(0.9)	92.9	(1.5)
Increased waterer space per animal compared to home pen	89.0	(2.6)	80.0	(3.2)	86.4	(2.1)
Increased bunk space per animal compared to home pen	91.6	(1.9)	75.9	(3.5)	87.1	(1.7)
Other resources	4.7	(1.6)	8.8	(2.2)	5.9	(1.3)

E. General Information

1. Parasiticides

Nearly all small feedlots (98.9 percent) and all large feedlots (100 percent) used at least one parasiticide during the year ending June 30,1999. More than three-quarters (78.8 percent) of all feedlots administered a preparation containing only an avermectin to at least some cattle. Large feedlots were more likely than small feedlots to use a combination avermectin/clorsulon preparation (34.5 percent compared to 6.8 percent, respectively). Similar percentages of large and small feedlots administered permethrins and organophosphates. For all feedlots, 23.0 percent used permethrins and 25.7 percent used organophosphates.

Oxfendazole and fenbendazole were among those included in the Other parasiticide category.

The parasiticides listed in the table below are not mutually exclusive as feedlots may have used more than one type.

a. Percent of ***feedlots*** that gave any cattle the following parasiticides by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Parasiticide	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Avermectins (such as Ivomec®, Eprinex®, Dectomax®)	79.7	(3.0)	76.3	(3.3)	78.8	(2.3)
Clorsulon (such as Curatrem®)	0.0	(--)	4.9	(1.7)	1.4	(0.5)
Avermectin/Clorsulon combination (Ivomec®Plus)	6.8	(1.8)	34.5	(4.1)	14.6	(1.8)
Levamisole (such as Totalon®, Tramisol®, Prohibit™)	6.7	(2.3)	8.1	(2.2)	7.1	(1.7)
Permethrins (such as Permectrin™, CyLence™, Ectiban®)	23.0	(3.8)	23.0	(3.5)	23.0	(2.9)
Organophosphates (Co-Ral®, Spotton, Tiguvon, Warbex)	26.7	(3.7)	22.9	(3.4)	25.7	(2.8)
Other parasiticide	13.4	(3.0)	7.7	(2.0)	11.8	(2.2)
Any parasiticide	98.9	(0.7)	100.0	(--)	99.2	(0.5)

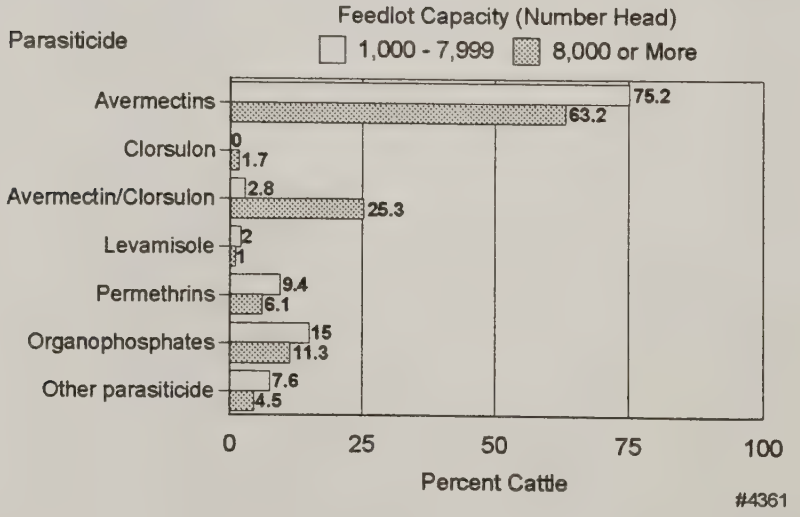
The majority of cattle (65.1 percent) were administered a parasiticide containing only an avermectin. A larger percentage of cattle on small feedlots (75.2 percent) than on large feedlots (63.2 percent) received such a preparation. However, 25.3 percent of cattle on large feedlots compared to 2.8 percent of cattle on small feedlots were administered a parasiticide containing an avermectin/clorsulon combination. Although similar percentages of feedlots used permethrins and organophosphates (see previous table), a lower percentage of cattle were administered a permethrin (6.7 percent) compared to an organophosphate (11.9 percent).

The parasiticides listed in the table below are not mutually exclusive as cattle may have been administered a parasiticide on more than one occasion.

b. Percent of ***cattle*** placed that were given the following parasiticides by feedlot capacity:

	Percent Cattle					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Parasiticide	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Avermectins (such as Ivomec®, Eprinex®, Dectomax®)	75.2	(3.2)	63.2	(4.2)	65.1	(3.6)
Clorsulon (such as Curatrem®)	0.0	(--)	1.7	(1.0)	1.5	(0.8)
Avermectin/Clorsulon combination (Ivomec® Plus)	2.8	(1.1)	25.3	(4.0)	21.7	(3.4)
Levamisole (such as Totalon®, Tramisol®, Prohibit™)	2.0	(0.9)	1.0	(0.4)	1.2	(0.3)
Permethrins (such as Permectrin™, CyLence™, Ectiban®)	9.4	(1.9)	6.1	(1.6)	6.7	(1.4)
Organophosphates (Co-Ral®, Spotton, Tiguvon, Warbex)	15.0	(2.5)	11.3	(2.9)	11.9	(2.5)
Other parasiticide	7.6	(1.9)	4.5	(1.4)	5.0	(1.2)

Percent of Cattle Placed that Were Given the Following Parasiticides by Feedlot Capacity



2. Fly control

Nearly all small feedlots (98.1 percent) and all large feedlots attempted to control flies using at least one method. The most common method was manure removal (96.9 percent of feedlots). However, 84.1 percent of small feedlots and 97.4 percent of large feedlots used practices other than manure removal to control flies. Most feedlots attempted to control flies using more than one method.

Large feedlots tended to use granular fly bait (82.1 percent), environmental sprays (71.0 percent), and biological control (predatory insects, 57.7 percent) more frequently than other methods. Small feedlots tended to use environmental sprays (57.1 percent), granular fly bait (55.4 percent), and compounds applied to animal (37.0 percent) more frequently than other methods. Small feedlots (18.1 percent) were more likely than large feedlots (7.2 percent) to use ear tags containing an insecticide. Large feedlots were more likely than small feedlots to use the remaining methods listed below, except for applying pour-ons or dusting powder.

The percentage of feedlots that used these control methods changed little from 1994 to 1999 (NAHMS Cattle on Feed Evaluation *Part II: Feedlot Health Management Report*). However, a greater percentage of feedlots used fly traps in 1999 (25.6 percent) than in 1994 (13.6 percent) and a lower percentage used granular fly bait in 1999 (62.8 percent) compared to 1994 (77.6 percent).

a. Percent of feedlots by methods used to control flies on the feedlot during the year ending June 30, 1999, and by feedlot capacity:

	Percent Feedlots by Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Method	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Manure removal	96.4	(1.2)	98.2	(1.1)	96.9	(0.9)
Biological control (predatory insects)	20.7	(2.5)	57.7	(4.2)	31.1	(2.1)
Ear tags containing insecticides	18.1	(3.3)	7.2	(2.1)	15.1	(2.4)
Environmental sprays	57.1	(3.9)	71.0	(3.7)	61.0	(3.0)
Pour-ons, dusting powder or animal spray	37.0	(4.1)	36.3	(4.0)	36.8	(3.2)
Feed additive that kills larva (such as phenothiazine, ronnel, Co-Ral®)	7.3	(2.3)	5.3	(1.9)	6.8	(1.7)
Sticky tape or other fly traps	22.2	(3.1)	34.2	(3.8)	25.6	(2.5)
Granular fly bait (such as Golden Malrin®)	55.4	(3.9)	82.1	(3.6)	62.8	(3.0)
Other method	3.0	(1.4)	13.2	(3.2)	5.8	(1.4)
Any method (other than manure removal)	84.1	(3.2)	97.4	(1.3)	87.8	(2.3)
Any method	98.1	(1.0)	100.0	(--)	98.6	(0.7)

3. Home pen environment

Nearly 83 percent of small feedlots compared to 43.4 percent of large feedlots provided wind breaks in at least some pens. Small feedlots were also more likely to supply shade in at least some pens than were large feedlots (39.7 percent compared to 21.6 percent). Sprinklers or misters to keep cattle cool were provided in at least some pens on 29.3 percent of small feedlots and 25.4 percent of large feedlots.

Note that some feedlots may have had sprinklers in pens primarily for dust control purposes that could also serve to cool cattle during extreme heat. Feedlot '99 results reported in Part I indicated that 8.0 percent of small feedlots and 17.6 percent of large feedlots had permanent sprinklers primarily for dust control. Additionally, 26.7 percent of large feedlots and 69.4 percent of small feedlots had mobile sprinklers primarily for dust control. Some of these units might be used to keep cattle cool when the need arises.

a. Percent of feedlots by frequency the following resources were provided for cattle in their home pens (excluding hospital, receiving and shipping pens) during the year ending June 30, 1999, and by feedlot capacity:

	Percent Feedlots by Feedlot Capacity						
	Frequency Resource Was Provided (Number Head)						
	All or Most Pens		Some Pens		No Pens		Total
Home Pen Resource	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
1,000 - 7,999							
Wind breaks	56.8	(3.6)	25.9	(3.2)	17.3	(2.5)	100.0
Shade	15.3	(3.3)	24.4	(3.5)	60.3	(3.6)	100.0
Sprinkles/misters to keep cattle cool	13.5	(2.8)	15.8	(3.2)	70.7	(3.9)	100.0
Mounds	59.4	(4.0)	25.0	(3.7)	15.6	(3.2)	100.0
8,000 or More							
Wind breaks	10.3	(3.3)	33.1	(3.7)	56.6	(4.0)	100.0
Shade	9.6	(2.9)	12.0	(2.5)	78.4	(3.5)	100.0
Sprinkles/misters to keep cattle cool	13.1	(2.8)	12.3	(2.7)	74.6	(3.5)	100.0
Mounds	65.6	(4.0)	19.1	(3.7)	15.3	(2.8)	100.0
All Feedlots							
Wind breaks	43.8	(2.7)	27.9	(2.5)	28.3	(2.1)	100.0
Shade	13.7	(2.5)	21.0	(2.6)	65.3	(2.7)	100.0
Sprinkles/misters to keep cattle cool	13.3	(2.1)	14.9	(2.4)	71.8	(2.9)	100.0
Mounds	61.1	(3.0)	23.4	(2.8)	15.5	(2.3)	100.0

4. Animal health and production information management

A higher percentage of large feedlots (10.3 percent) than small feedlots (2.8 percent) found the World Wide Web ***very important*** for gathering animal health and production information; however, overall, only 4.9 percent of all feedlots found it to be ***very important***. Two-thirds of small feedlots (63.2 percent) and nearly one-half of large feedlots (47.2 percent) responded that the web was not important for their feedlot. Currently, much production information can be obtained through other sources. Once these services and others, such as cattle procurement, become widely available on-line, the web may become more important to feedlot operators.

a. Percent of feedlots by level of importance of the Internet and World Wide Web for obtaining cattle health and production information for their feedlot and by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Level of Importance	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Very important	2.8	(1.1)	10.3	(2.4)	4.9	(1.0)
Somewhat important	34.0	(3.9)	42.5	(4.2)	36.4	(3.1)
Not important	63.2	(3.9)	47.2	(4.1)	58.7	(3.1)
Total	100.0		100.0		100.0	

Almost all large feedlots (95.8 percent) and two-thirds of small feedlots (63.5 percent) stored animal health and/or production information in an electronic data base.

b. Percent of feedlots that stored production and/or animal health-related information in a computer data base by feedlot capacity:

Percent Feedlots					
Feedlot Capacity (Number Head)					
1,000 - 7,999		8,000 or More		All Feedlots	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
63.5	(4.2)	95.8	(1.8)	72.6	(3.0)

Of the feedlots using an electronic information storage system, more large feedlots tended to consider each of the following uses of an electronic data base to be ***very important*** than small feedlots. Higher percentages of both large and small feedlots considered tracking production and economic records on computers to be ***very important*** compared to other uses. The next highest percentage for large feedlots was tracking withdrawal times (88.7 percent), whereas on small feedlots it was comparing current information to historical information (55.1 percent).

The previous and following table clearly indicate that a broad majority of large feedlots rely on computerized technology to store data and as a health and/or production management tool.

c. For feedlots that stored production and/or animal health-related information in a computer data base, percent of feedlots by level of importance of computers for the following types of use and by feedlot capacity:

	Percent Feedlots						
	Level of Importance and Feedlot Capacity (Number Head)						Total
	Very Important		Somewhat Important		Not Important		
Type of Use	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
1,000 - 7,999							
Comparing feedlot to other feedlots	23.0	(3.8)	49.0	(4.9)	28.0	(4.5)	100.0
Comparing current information to historical information	55.1	(5.1)	39.0	(4.9)	5.9	(2.3)	100.0
Tracking withdrawal times	43.8	(5.0)	18.8	(3.9)	37.4	(5.0)	100.0
Tracking production	79.5	(4.1)	17.3	(4.0)	3.2	(1.8)	100.0
Tracking economic records	83.0	(3.6)	12.8	(3.3)	4.2	(2.0)	100.0
8,000 or More							
Comparing feedlot to other feedlots	43.2	(4.4)	43.7	(4.3)	13.1	(2.7)	100.0
Comparing current information to historical information	65.0	(3.9)	31.5	(3.8)	3.5	(1.5)	100.0
Tracking withdrawal times	88.7	(2.7)	5.9	(2.0)	5.4	(1.8)	100.0
Tracking production	90.4	(2.4)	8.0	(2.2)	1.6	(1.0)	100.0
Tracking economic records	90.4	(2.3)	6.9	(1.9)	2.7	(1.3)	100.0
All Feedlots							
Comparing feedlot to other feedlots	30.4	(3.0)	47.1	(3.5)	22.5	(3.0)	100.0
Comparing current information to historical information	58.8	(3.5)	36.2	(3.4)	5.0	(1.6)	100.0
Tracking withdrawal times	60.4	(3.5)	14.0	(2.6)	25.6	(3.3)	100.0
Tracking production	83.5	(2.7)	13.9	(2.7)	2.6	(1.2)	100.0
Tracking economic records	85.8	(2.5)	10.6	(2.2)	3.6	(1.4)	100.0

F. Biosecurity

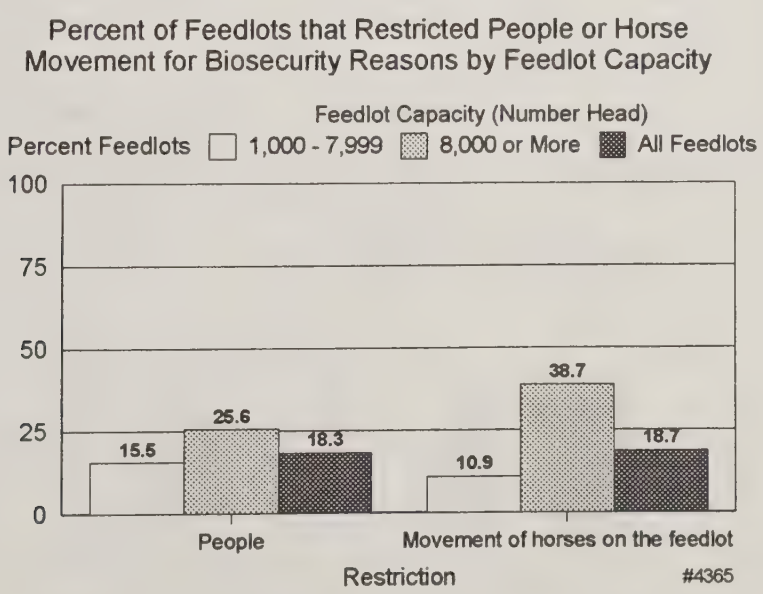
1. Control of human and animal movement

Biosecurity can be a valuable and effective tool in the control of infectious pathogens of cattle and people. The following table refers to limits or controls on the movement of people and horses on the feedlot. For example, non-employees may be denied access or made to wear clean clothing. Restriction of horses might include preventing entry of horses, unless they are from a designated area, or preventing horses from reentering after leaving the feedlot.

A greater percentage of small feedlots (35.4 percent) than large feedlots (1.7 percent) did not allow any horses on the premises. Greater percentages of large feedlots compared to small feedlots restricted movement of people and horses on the feedlot. Feedlots may restrict movement of people for reasons other than for biosecurity, although this information was not collected as part of the Feedlot '99 study.

a. Percent of feedlots that restricted people or horse movement (or no horses allowed) for biosecurity reasons by feedlot capacity:

	Percent Feedlots			
	Restriction and Feedlot Capacity (Number Head)			
	Restrict Movement		No Horses Allowed	
Restriction	Percent	Standard Error	Percent	Standard Error
1,000 - 7,999				
People	15.5	(3.1)	N/A	N/A
Movement of horses on the feedlot	10.9	(2.3)	35.4	(3.6)
8,000 or More				
People	25.6	(3.9)	N/A	N/A
Movement of horses on the feedlot	38.7	(3.9)	1.7	(1.1)
All Feedlots				
People	18.3	(2.5)	N/A	N/A
Movement of horses on the feedlot	18.7	(2.0)	26.0	(2.6)



Except for wild ruminants, more than 50 percent of feedlots considered each category of animal listed below to be a problem. Rodents were more likely to receive aggressive or moderate control (72.8 percent of all feedlots) than any other category of animal. Nearly one-half (45.1 percent) of feedlots practiced aggressive or moderate control of coyotes, foxes, and stray dogs, while approximately one-third (34.3 percent) practiced aggressive or moderate control of raccoons, skunks, rabbits and squirrels.

While 86.3 percent of feedlots perceived birds to be a problem, the majority of feedlots (61.0 percent) put in minimal effort or made no attempts to control them.

b. Percent of feedlots that attempted to control the presence of the following animals on the feedlot premises during the year ending June 30, 1999, by level of effort:

Percent Feedlots

	Level of Effort										
	Aggressive		Moderate		Minimal		No Control		Not a Problem		Total
Animal	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent
Coyotes, foxes, and stray dogs	18.2	(2.2)	26.9	(2.8)	19.1	(2.6)	6.1	(1.4)	29.7	(3.2)	100.0
Stray cats	4.6	(1.1)	13.4	(2.0)	24.3	(2.9)	20.1	(2.6)	37.6	(3.3)	100.0
Wild ruminants (such as deer and elk)	1.7	(0.6)	4.5	(1.3)	13.4	(2.4)	26.1	(3.0)	54.3	(3.3)	100.0
Rodents	44.8	(3.1)	28.0	(2.9)	14.6	(2.4)	4.7	(1.5)	7.9	(1.9)	100.0
Small animals (such as raccoons, skunks, rabbits, squirrels)	10.8	(1.9)	23.5	(2.7)	16.9	(2.2)	25.1	(3.0)	23.7	(2.9)	100.0
Birds	8.3	(1.6)	17.0	(2.3)	23.9	(2.8)	37.1	(3.0)	13.7	(2.3)	100.0

2. Maintenance of water troughs

Nearly all feedlots cleaned their water troughs during each season. Only a small percentage of small feedlots (3.6 percent) cleaned their waterers annually or semi-annually.

a. Percent of feedlots that routinely cleaned water troughs by season and by feedlot capacity:

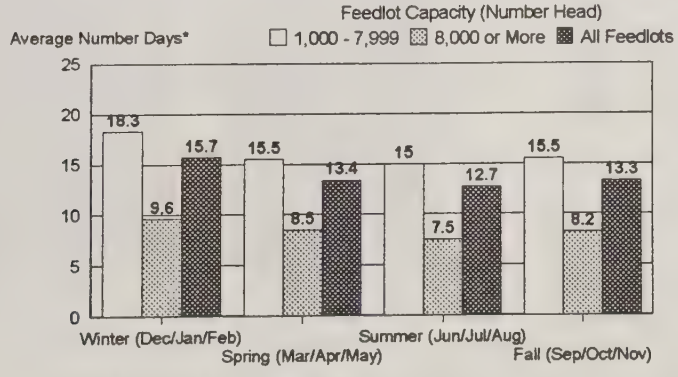
	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Season (Months)	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Winter (December, January, February)	93.4	(2.4)	99.2	(0.8)	95.0	(1.7)
Spring (March, April, May)	93.4	(2.4)	100.0	(--)	95.2	(1.7)
Summer (June, July, August)	93.1	(2.5)	100.0	(--)	95.1	(1.8)
Fall (September, October, November)	93.3	(2.4)	100.0	(--)	95.2	(1.7)
Annually or semi-annually	3.6	(1.7)	0.0	(--)	2.6	(1.2)

The number of days between water trough cleaning tended to be lowest in summer (12.7 days) and greatest in winter (15.7 days). The interval between cleaning waterers for larger feedlots was approximately one-half that of small feedlots.

b. For feedlots that routinely cleaned water troughs in the following season, average number of days between routine cleaning of water troughs by season and by feedlot capacity:

	Average Number Days					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
[Number Days] Season (Months)	Number Days	Standard Error	Number Days	Standard Error	Number Days	Standard Error
Winter (December, January, February)	18.3	(1.4)	9.6	(1.0)	15.7	(1.1)
Spring (March, April, May)	15.5	(1.3)	8.5	(0.7)	13.4	(0.9)
Summer (June, July, August)	15.0	(1.3)	7.5	(0.7)	12.7	(0.9)
Fall (September, October, November)	15.5	(1.3)	8.2	(0.7)	13.3	(0.9)

Average Number Days* Between Routine Cleaning of Water Troughs by Season and by Feedlot Capacity



*For feedlots that routinely cleaned water troughs in the specified season. #4366

3. Storage of feedstuffs

Only the ***primary*** method by which feedlots stored basic feed commodities is reported below. Feedlots may have used more than one method. Sealed containers (silos, tanks, bins, or drums) were the primary method of storage for all feed commodities except roughage and mineral supplement. Approximately one-half of small feedlots stored mineral supplement in bags, and one-third primarily stored it in sealed containers. Of large feedlots, 35.8 percent primarily stored mineral supplement in bags, and one-half primarily used sealed containers. Large feedlots were more likely than small feedlots to primarily store feed additives, such as ionophores, in bags (35.8 percent compared to 14.5 percent, respectively).

a. Percent of feedlots by ***primary*** method of storing the following feedstuffs and by feedlot capacity:

	Percent Feedlots										
	Storage Method and Feedlot Capacity (Number Head)										
	Bags		Sealed Containers (Silos, Tanks, Bins, Drums)		Uncovered Piles, Bunks, Pits		Covered Piles, Bunks, Pits, or Sheds		Not Applicable		Total
Type of Feedstuff	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent	Stand. Error	Percent
1,000 - 7,999											
Mineral supplement	50.1	(4.3)	32.5	(4.0)	1.8	(1.0)	2.9	(1.4)	12.7	(2.8)	100.0
Protein supplement	2.6	(1.4)	86.7	(2.9)	4.6	(1.9)	4.9	(1.7)	1.2	(1.2)	100.0
Fat supplement	0.0	(--)	20.6	(2.8)	0.6	(0.6)	0.6	(0.6)	78.2	(2.9)	100.0
Feed additives, such as ionophores	14.5	(3.0)	71.1	(3.9)	0.7	(0.7)	3.2	(1.2)	10.5	(2.7)	100.0
Energy concentrates, such as corn	0.0	(--)	65.8	(3.8)	6.6	(1.7)	27.3	(3.6)	0.3	(0.2)	100.0
Roughage, such as hay or silage	0.0	(--)	5.4	(2.1)	61.6	(4.2)	32.7	(4.2)	0.3	(0.2)	100.0
8,000 or More											
Mineral supplement	35.8	(4.0)	49.6	(4.1)	0.9	(0.8)	4.5	(2.0)	9.2	(2.4)	100.0
Protein supplement	0.0	(--)	85.1	(3.0)	4.0	(1.5)	10.0	(2.6)	0.9	(0.8)	100.0
Fat supplement	0.0	(--)	75.5	(3.6)	2.6	(1.3)	1.0	(0.9)	20.9	(3.4)	100.0
Feed additives, such as ionophores	35.8	(4.0)	48.2	(4.1)	2.9	(1.4)	4.1	(1.8)	9.0	(2.4)	100.0
Energy concentrates, such as corn	0.6	(0.6)	63.5	(4.1)	8.7	(2.3)	27.2	(3.8)	0.0	(--)	100.0
Roughage, such as hay or silage	0.0	(--)	5.5	(1.8)	53.6	(4.1)	40.9	(4.0)	0.0	(--)	100.0
All Feedlots											
Mineral supplement	46.2	(3.3)	37.3	(3.1)	1.5	(0.7)	3.3	(1.1)	11.7	(2.1)	100.0
Protein supplement	1.9	(1.0)	86.3	(2.3)	4.4	(1.4)	6.3	(1.4)	1.1	(0.9)	100.0
Fat supplement	0.0	(--)	36.0	(2.3)	1.2	(0.5)	0.7	(0.5)	62.1	(2.3)	100.0
Feed additives, such as ionophores	20.4	(2.5)	64.7	(3.1)	1.3	(0.6)	3.5	(1.0)	10.1	(2.1)	100.0
Energy concentrates, such as corn	0.2	(0.2)	65.1	(2.9)	7.2	(1.4)	27.3	(2.8)	0.2	(0.1)	100.0
Roughage, such as hay or silage	0.0	(--)	5.4	(1.6)	59.4	(3.2)	35.0	(3.2)	0.2	(0.1)	100.0

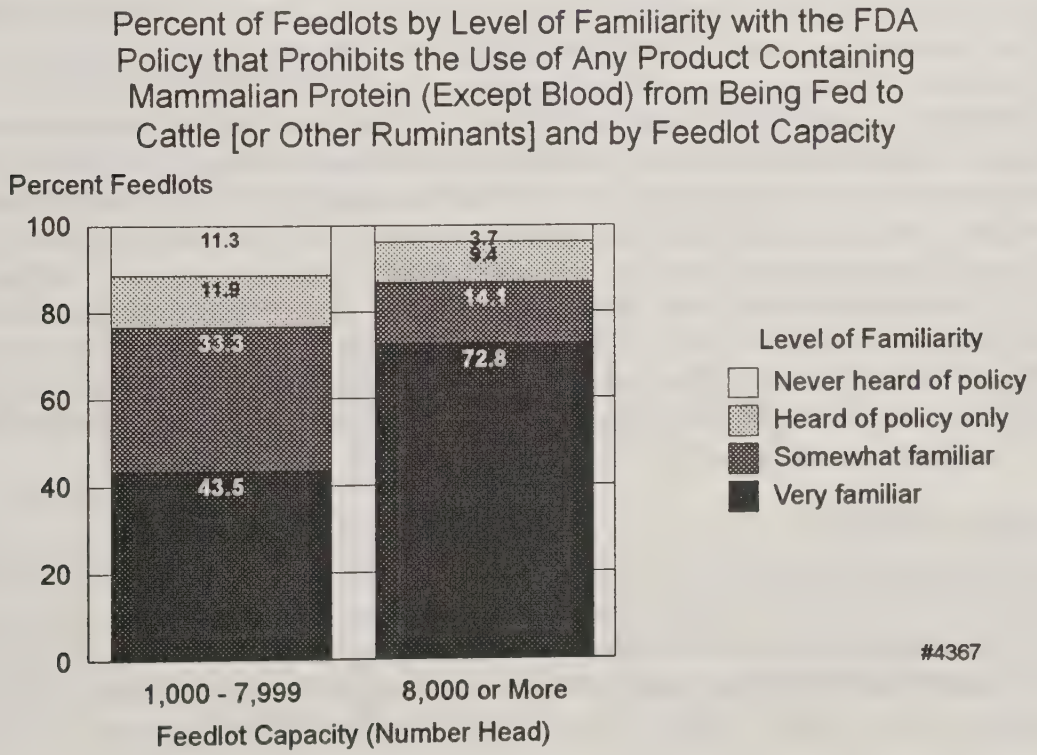
4. Familiarity with FDA policy

A greater percentage of large feedlots (72.8 percent) than small feedlots (43.5 percent) were ***very familiar*** with the policy of the Food and Drug Administration (FDA) that prohibits the use of any product containing mammalian protein (except blood) from being fed to cattle. For all feedlots, approximately four out of five (79.6 percent) were ***very*** or ***somewhat familiar*** with the FDA's policy, and 90.8 percent had at least heard of it.

The level of familiarity with the FDA's policy on feedlots may be greater than reported here because the people responsible for ration manufacturing on the feedlots, who have the greatest interaction with nutritionists and knowledge of the policy, may not have been the contacts providing data during questionnaire administration.

a. Percent of feedlots by level of familiarity with the Food and Drug Administration's (FDA) policy that prohibits the use of any product containing mammalian protein (except blood) from being fed to cattle [or other ruminants] and by feedlot capacity:

	Percent Feedlots					
	Feedlot Capacity (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Level of Familiarity	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Very familiar	43.5	(4.2)	72.8	(3.7)	51.7	(3.2)
Somewhat familiar	33.3	(4.2)	14.1	(2.7)	27.9	(3.1)
Heard of policy only	11.9	(2.6)	9.4	(2.6)	11.2	(2.0)
Never heard of policy	11.3	(2.9)	3.7	(1.6)	9.2	(2.2)
Total	100.0		100.0		100.0	



Section II: Methodology

A. Needs Assessment

Objectives were developed for the Feedlot '99 study from input obtained over a period of several months via a number of focus groups and individual contacts. Participants included producer representatives, government personnel, veterinary consultants, researchers, and animal health officials.

Feedlot '99 study objectives were to:

1) Describe animal health management practices in feedlots and their relationship to cattle health.

2) Describe changes in management practices and animal health in feedlots from 1994 to 1999.

3) Identify factors associated with shedding of specified pathogens by feedlot cattle, such as:
   - *E. coli* 0157
   - *Salmonella* spp.
   - *Campylobacter* spp.

4) Describe antimicrobial usage in feedlots.

5) Identify priority areas for pre-arrival processing of cattle and calves.

6) Describe the management in feedlots that impacts product quality.

B. Sampling and Estimation

1. State selection

A goal of the NAHMS national studies is to include states that account for at least 70 percent of the animal and producer population. The National Agricultural Statistics Service (NASS) publishes the number of cattle on feed and the number of feedlots in the U.S. The February 1999 report shows that 2 percent of the feedlots had over 80 percent of the U.S. inventory. These feedlots were those with 1,000 head or more one-time capacity. Therefore, to enhance prudent use of available resources, our goal of focusing on animal health was achieved by concentrating efforts where most of the animals were located. This plan meant examining those feedlots with 1,000-head or more capacity. On a monthly and quarterly basis, the NASS surveys these large feedlots in 12 key cattle feeding states, which in general are those states with the largest inventories. To minimize respondent burden on these large feedlots, NAHMS chose to direct efforts in these same 12 feedlot states which were Arizona, California, Colorado, Idaho, Iowa, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Washington. The number of feedlots published for these 12 states in 1998 was 1,746. On January 1, 1999, they had 10,217,000 head on feed.

2. Feedlot selection

A total of 1,250 feedlots were selected from a population of 1,782 feedlots based on NASS' May 1999 Cattle on Feed survey. In eight of the 12 NAHMS states, all feedlots were selected. In the remaining four states (Colorado, Iowa, Kansas, and Nebraska), a sample of operations was selected to match resource availability both within the state and nationally. These four states were chosen for subsampling because of their relatively large number of smaller feedlots. In these four states, all

feedlots with more than 4,000 head were included in the sample, while the sampling interval varied between one in 1.61 (Colorado) to one in 4.39 (Nebraska) for smaller feedlots.

3. Population inferences

Inferences cover the population of feedlots with 1,000 head or more one-time capacity in the 12 study states since these feedlots were the only ones eligible for sample selection. These states accounted for 84.3 percent of the feedlots with a 1,000-head or more capacity in the U.S. and 95.8 percent of the U.S. cattle on feed inventory on those feedlots as of January 1, 1999, or 77.3 percent of all cattle on feed in the U.S. *All respondent data were properly weighted to reflect the population from which it was selected.* The inverse of the probability of selection for each of the 1,250 feedlots was the initial selection weight. This selection weight was adjusted for non-response within each of two regions and two size groups to allow for inferences back to the original population from which the sample was selected.

C. Data Collection

1. Phase I: Feedlot Management Report, August 16 - September 7, 1999

NASS enumerators administered the Feedlot Management Report. The interview took approximately 1 hour to complete.

2. Phase II: Veterinary Services Visit, October 12 - January 7, 1999

Farms for which the operation had signed a consent form were contacted by Veterinary Services (VS) for the second phase of the study. Veterinary Medical Officers (VMO's) contacted each feedlot, explained the program, and, if the feedlot agreed to continue in the study, administered a questionnaire. Feedlot '99 Parts II and III report the results of this phase of the study.

D. Data Analysis

1. Validation and estimation

Initial data entry and validation for the Feedlot Management Report (results reported in Feedlot '99 Part I) were performed in each individual NASS state office. Data were entered into a SAS data set. NAHMS national staff performed additional data validation on the entire data set after data from all states were combined.

Data entry and editing for the VS visit phase of Feedlot '99 were done by the NAHMS national staff in Fort Collins, CO. VS field staff followed up with producers, where necessary, to ensure data validation. Summarization and estimation for Parts II and III were performed by NAHMS national staff using SUDAAN software (1996. Research Triangle Park, NC).

2. Response rates

A total of 520 of the initially selected 1,250 feedlots completed the Feedlot Management Report (Feedlot '99 Part I). There were 130 selected feedlots (10.4 percent) that had zero cattle on feed, were out of business, or were otherwise out of scope for the study (Table 1). These two groups combined (n=650) represented the respondents to the survey. The response rate (650/1,250 = 52.0%) was similar to the response rate from the NAHMS' 1994 Cattle on Feed Evaluation (43.5% for feedlots

with a capacity of 1,000 or more head). Forty-one selected feedlots were inaccessible or could not be contacted within the study timelines.

There were 341 of the 520 respondents to the Feedlot Management Report, conducted by NASS enumerators, who consented to have their names turned over to VS for potential participation in the second phase of the Feedlot '99 study. Of these 341 feedlots, 275 participated in the VS phase of the study. The overall response rate for Phase II was 52.9 percent (275/520).

Response Category	Number Feedlots	Percent Feedlots
Completed survey	520	41.6
Had zero cattle on feed	83	6.6
Out of business	40	3.2
Out of scope of survey	7	0.6
Refusals	559	44.7
Inaccessible	41	3.3
Total	1,250	100.0

Appendix I: Sample Profile

A. Responding Feedlots

1. Number and percent of feedlots by feedlot capacity and by region:

Number and Percent Feedlots

	Size of Feedlot (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Region	Number	Percent	Number	Percent	Number	Percent
Central	115	41.8	97	35.3	212	77.1
Other	48	17.5	15	5.4	63	22.9
Total	163	59.3	112	40.7	275	100.0

2. Number and percent of feedlots by number of placements

Number Placements	Number Feedlots	Percent Feedlots
1-2,499	70	25.4
2,500-9,999	85	30.9
10,000-39,999	72	26.2
40,000 or more	48	17.5
Total	275	100.0

Appendix II

Impact of Question Format on Response and Estimation

Antimicrobial Use in Feed and Water

The first Feedlot '99 questionnaire administered to feedlot operators by National Agricultural Statistics Service (NASS) enumerators contained a question related to use of antimicrobials in feed or water. Operators were not prompted with a list of potential antimicrobials that could be contained in the feed or water but were asked to specify the number of days that antimicrobics were included in the feed and the number of days that antimicrobics were included in the water. As part of the second phase of Feedlot '99, the feedlot operators were questioned in more detail regarding use of antimicrobials in feed or water. They were provided a list of nine antimicrobials (see page 15) and were asked to respond regarding the percent of cattle, both less than 700 pounds and 700 pounds or more when placed, that received each of the antimicrobics and for how many days each antimicrobic was in the feed or water.

Operators for a total of 275 feedlots responded to both questions on the respective interviews. Of these feedlots, responses for 218 were consistent regarding either providing (191 feedlots) or not providing (27 feedlots) antimicrobials in the feed or water. In the NASS interview, respondents for 27 feedlots stated that they used antimicrobials. When presented with a list of specific antimicrobials in the second interview, they contradicted themselves. Similarly, respondents for 30 feedlots stated in the first interview that they did not use antimicrobials in feed and in the second interview were able to list one, or sometimes two, antimicrobials that they put in the feed. Tylosin was the most frequently listed antimicrobic (n=17) followed by Chlortetracycline (n=10) for these feedlots.

Respondents for an equal number of feedlots gave inconsistent responses resulting in point estimates of the frequency of use that were fairly close when comparing overall use. Standard errors in the NASS interview were substantially smaller because of the larger sample size in that phase compared to the second phase.

Percent Feedlots

	Size of Feedlot (Number Head)					
	1,000 - 7,999		8,000 or More		All Feedlots	
Interview	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
NASS	79.1	(2.2)	73.7	(1.8)	77.6	(1.6)
Second	85.2	(2.9)	77.9	(3.3)	83.2	(2.3)

NAHMS FEEDLOT '99 Study: Completed and Expected Outputs and Related Study Objectives

1. Describe changes in management practices and animal health in feedlots from 1994 to 1999.
   - Changes in the U.S. Beef Feedlot Industry, 1994-1999, August 2000

2. Describe the management in feedlots that impacts product quality.
   - Part I: Baseline Reference of Feedlot Management Practices, 1999, May 2000
   - Part II: Baseline Reference of Feedlot Health and Health Management Practices, 1999, November 2000
   - ***Part III: Health Management and Biosecurity in U.S. Feedlots, 1999***, December 2000
   - Quality assurance (interpretive report), expected 2001
   - Water quality (info sheet), December 2000
   - Feed quality (info sheet), expected 2001

3. Identify factors associated with shedding by feedlot cattle of specified pathogens, such as *E. coli* 0157, *Salmonella* spp., and *Campylobacter* spp.
   - *E. coli* 0157:H7 (info sheet), expected 2001
   - *Salmonella* (info sheet), expected 2001
   - *Campylobacter* (info sheet), expected 2001

4. Describe antimicrobial usage in feedlots.
   - Part I: Baseline Reference of Feedlot Management Practices, *1999*, May 2000
   - Part II: Baseline Reference of Feedlot Health and Health Management Practices, 1999, November 2000
   - ***Part III: Health Management and Biosecurity in U.S. Feedlots, 1999***, December 2000
   - Injection practices (info sheet), November 2000
   - Antimicrobial usage in feedlots (interpretive report), expected 2001

5. Identify priority areas for pre-arrival processing of cattle and calves.
   - Part I: Baseline Reference of Feedlot Management Practices, 1999, May 2000
   - Part II: Baseline Reference of Feedlot Health and Health Management Practices, 1999, November 2000
   - Implants (info sheet), May 2000
   - Attitudes toward pre-arrival processing (info sheet), November 2000
   - Vaccination against respiratory disease pathogens (info sheet), November 2000

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